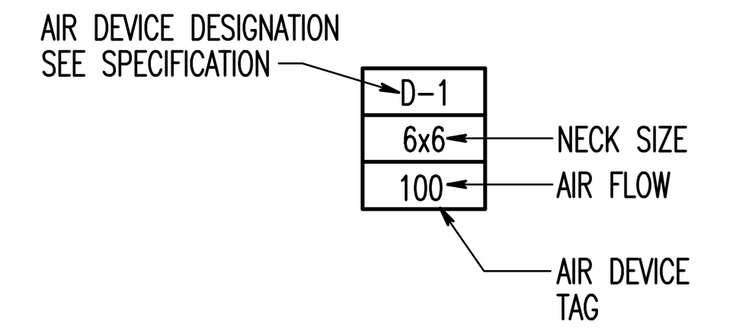
MECHANICAL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SOIL OR WASTE		OUTDOOR AIR OR SUPPLY AIR DUCT
	VENT		RETURN AIR DUCT
BWV	BACK WATER VALVE		EXHAUST AIR DUCT
— SW —	STORM WATER		LINED DUCT
— SSW —	SECONDARY STORM WATER	D	DROP IN DUCTWORK
D–(–)	DRAIN (ALL TYPES)	R	RISE IN DUCTWORK
— PD —	PUMP DISCHARGE		VOLUME DAMPER
	COLD WATER		GRAVITY BACKDRAFT DAMPER
	HOT WATER		BAROMETRIC BACKDRAFT DAMPER
	HOT WATER RETURN		MOTOR OPERATED DAMPER
— HS —	HOT WATER HEATING SUPPLY		FIRE DAMPER
--- HR ---	HOT WATER HEATING RETURN		SMOKE DAMPER
— CHS —	CHILLED WATER SUPPLY		COMBINATION FIRE AND SMOKE DAMPER
--- CHR ---	CHILLED WATER RETURN		DUCT MOUNTED SMOKE DETECTOR
— GWS —	GLYCOL WATER SUPPLY	SPSS	STATIC PRESSURE SENSING STATION
--- GWR ---	GLYCOL WATER RETURN	AFMS	AIRFLOW MONITORING STATION
— D —	CONDENSATE DRAIN		FLEXIBLE CONNECTION
— X# —	X# STEAM		SINGLE DUCT AIR CONDITIONING TERMINAL UNIT
--- X# ---	X# RETURN		DUCT MOUNTED VOLUME REGULATOR
— VV —	VAPOR VENT	T	THERMOSTAT/TEMPERATURE SENSOR
— PC —	PUMPED CONDENSATE	H	HUMIDISTAT/HUMIDITY SENSOR
	STEAM TRAP (ALL TYPES)		CUBIC FEET PER MINUTE
G	GAS METER	A / M-1	SECTION DESIGNATION TOP – SECTION REFERENCE, BOTTOM – REFERENCED DRAWING
	SHUTOFF VALVE	— F —	FIRE LINE
	BALANCING VALVE	— SP —	SPRINKLER PIPING
	CHECK VALVE		PENDENT SPRINKLER HEAD
	RELIEF VALVE		UPRIGHT SPRINKLER HEAD
	PRESSURE REDUCING VALVE		SIDEWALL SPRINKLER HEAD
	THROTTLING VALVE		ALARM CHECK VALVE
	SOLENOID VALVE		SUPERVISED VALVE
	TWO WAY AUTOMATIC CONTROL VALVE		FLOW ALARM SWITCH
	THREE-WAY AUTOMATIC CONTROL VALVE		FIRE SERVICE CHECK VALVE
	THERMAL EXPANSION VALVE		FIRE SERVICE DOUBLE CHECK BACKFLOW PREVENTER
	UNION		FIRE SERVICE REDUCED PRESSURE ZONE BACKFLOW PREVENTER
	STRAINER		SIAMESE CONNECTION
	ANCHOR		FIRE TEST HEADER
	EXPANSION JOINT		MIXING VALVE
	PIPE GUIDE		
	AIR VENT		
	THERMOMETER		
	PRESSURE GAUGE		
2.0	FLOW INDICATOR FOR STATIONARY METER (GPM)		
	CAP (PIPE OR DUCT)		
	CONNECT TO EXISTING		
	END POINT OF REMOVAL OF EXISTING		

AIR DEVICE TAG



MECHANICAL ABBREVIATIONS

ACH	AIR CHANGES PER HOUR
ACU	AIR CONDITIONING UNIT
ACV	AUTOMATIC CONTROL VALVE
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AFMS	AIR FLOW MONITORING STATION
AHU	AIR HANDLING UNIT
ANC	ANCHOR
APD	AIR PRESSURE DROP
ATC	AUTOMATED TEMPERATURE CONTROLS
ATU	AIR TERMINAL UNIT
AV	ACID VENT/AIR VENT
AVG	AVERAGE
AW	ACID WASTE
AWG	AMERICAN WIRE GAGE
BAS	BUILDING AUTOMATION SYSTEM
BBD	BAROMETRIC BACKDRAFT DAMPER
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BI	BACKWARD INCLINED
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
CAP	CAPACITY
CC	COOLING COIL
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CI	CAST IRON
CIP	CAST IRON PIPE
CL	CENTERLINE
CLG	CEILING/COOLING
CNTR	CENTER
COL	COLUMN
CONC	CONCRETE
COND	CONDENSATE/CONDENSER/CONDENSING
CONN	CONNECTION
CONV	CONVECTOR/CONVERTER
COP	COEFFICIENT OF PERFORMANCE
CU	COPPER/CUBIC
CV	CHECK VALVE/CONSTANT VOLUME
CW	COLD WATER
CX	CONNECT TO EXISTING
D	DAMPER/DEEP/DEPTH/DIAMETER/DIFFUSER/DRAIN/DROP
DB	DECIBEL/DRY BULB
DEG	DEGREES
DESIG	DESIGNATION
DET	DETAIL
DIA	DIAMETER
DN	DOWN
DPS	DIFFERENTIAL PRESSURE SWITCH
DWG	DRAWING
DWH	DOMESTIC WATER HEATER
E	EAST/ELECTRICAL
EA	EACH/EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EER	ELECTRICAL EQUIPMENT ROOM/ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EFT	ENTERING FLUID TEMPERATURE
EQUIP	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
ETR	EXISTING TO REMAIN
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING
EXH	EXHAUST
F	FAHRENHEIT/FAN/FIRE/FIRE LINE/FREEZESTAT
FC	FLEXIBLE CONNECTION/FORWARD CURVED
FCO	FLOOR CLEANOUT
FCU	FAN COIL UNIT
FD	FIRE DAMPER/FLOOR DRAIN
FDV	FIRE DEPARTMENT VALVE
FF	FINISHED FLOOR/FLOOR-TO-FLOOR
FIG	FIGURE
FLA	FULL LOAD AMPS
FOB	FLAT ON BOTTOM
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FOT	FLAT ON TOP
FPB	FAN POWERED BOX TERMINAL UNIT
FPD	FLUID PRESSURE DROP
FPM	FEET PER MINUTE
FS	FLOW SWITCH
FSD	COMBINATION FIRE AND SMOKE DAMPER
FT	FEET/FOOT
FTR	FINNED TUBE RADIATION
FV	FACE VELOCITY
G	GAS/GRAMS/GRILLE
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GBD	GRAVITY BACKDRAFT DAMPER
GEN	GENERAL
GI	GREASE INTERCEPTOR
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GRD	GREASE RECOVERY DEVICE
GS	GREASE SANITARY
GWH	GAS-FIRED WATER HEATER
H	HEIGHT/HIGH/HUMIDISTAT/HUMIDITY SENSOR
HB	HOSE BIBB
HC	HEATING COIL
HOA	HAND-OFF-AUTOMATIC SWITCH
HORIZ	HORIZONTAL
HP	HEAT PUMP/HIGH PRESSURE/HORSEPOWER
HR	HOT WATER HEATING RETURN/HOUR
HS	HOT WATER HEATING SUPPLY
HVAC	HEATING,VENTILATING, AND AIR CONDITIONING
HW	HOT WATER
HX	HEAT EXCHANGER
HZ	HERTZ
I	INLET/INPUT
ID	INSIDE DIAMETER
IN	INCH/INCHES
INSUL	INSULATION/INSULATED
INT	INTERIOR
INV	INVERT
IPS	IRON PIPE SIZE
IW	INDIRECT WASTE
K	KITCHEN EQUIPMENT TYPE
KG	KILOGRAMS
KM	KILOMETER
KO	KNOCK-OUT
KW	KILOWATT
KWH	KILOWATT HOURS
L	LENGTH/LITERS/LOUVER
LAT	LEAVING AIR TEMPERATURE
LAV	LAVATORY
LB	POUNDS
LFT	LEAVING FLUID TEMPERATURE
LP	LOW PRESSURE
LWT	LEAVING WATER TEMPERATURE
M	MECHANICAL/METERS
MA	MEDICAL AIR/MIXED AIR
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MER	MECHANICAL EQUIPMENT ROOM
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MOD	MOTOR-OPERATED DAMPER
MOV	MOTOR-OPERATED VALVE
MP	MEDIUM PRESSURE
MTD	MOUNTED
MTG	MOUNTING
MV	MEDICAL VACUUM/MIXING VALVE
N	NEWTONS/NITROGEN/NORTH
N/A	NOT APPLICABLE
NC	NOISE CRITERIA/NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NITROUS OXIDE/NORMALLY OPEN/NUMBER
NOM	NOMINAL
NPLV	NON-STANDARD PART LOAD VALUE
NPSH	NET POSITIVE SUCTION HEAD
NPSHA	NET POSITIVE SUCTION HEAD AVAILABLE
NPSHR	NET POSITIVE SUCTION HEAD REQUIRED
NPW	NON-POTABLE WATER
NTS	NOT TO SCALE
O	OUTPUT/OXYGEN
OA	OUTDOOR AIR
OC	ON CENTER
OD	OUTSIDE DIAMETER
OED	OPEN-END DUCT
OF	OVERFLOW
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OH	OVERHEAD
OPER	OPERATING/OPERATOR
P	PIPE/PLUMBING FIXTURE TYPE/PRESSURE/PUMP
PA	PASCAL
PD	PRESSURE DROP/PUMP DISCHARGE
PE	POLYETHYLENE
PF	PLENUM FAN
PH	PHASE
PHC	PREHEAT COIL
PP	POLYPROPYLENE
PPM	PARTS PER MILLION
PREL	PRELIMINARY
PRESS	PRESSURE
PROP	PROPELLER
PRV	PRESSURE REDUCING VALVE
PSF	POUNDS PER SQUARE FOOT
PSI	PRESSURE – POUNDS PER SQUARE INCH
PSIG	PRESSURE – POUNDS PER SQUARE INCH, GAGE
PVC	POLYVINYL CHLORIDE
R	RADIUS/REFRIGERANT/REGISTER/RISE/RISER
RA	RETURN AIR
RAD	RADIUS
RAF	RETURN AIR FAN
RD	ROUND
REF	REFERENCE/REFRIGERANT/REFIGERATION
REFRIG	REFRIGERANT/REFRIGERATION
REQD	REQUIRED
RET	RETURN
REV	REVISE/REVISION
RH	REHEAT/RELATIVE HUMIDITY
RHC	REHEAT COIL
RL	RAIN LEADER/REFRIGERANT LIQUID
ROR	REVERSE OSMOSIS WATER RETURN
ROS	REVERSE OSMOSIS WATER SUPPLY
RPM	REVOLUTIONS PER MINUTE
RPS	REVOLUTIONS PER SECONDS
RS	REFERENCE SENSOR/REFRIGERANT SENSOR/REFRIGERANT SUCTION
RV	RELIEF VALVE
RX	REMOVE EXISTING
S	SANITARY/SECONDS/SOIL/SOUTH/SWICH
SA	SOUND ATTENUATOR/SUPPLY AIR
SAF	SUPPLY AIR FAN
SCH	SCHEDULE
SCHR	SECONDARY CHILLED WATER RETURN
SCHS	SECONDARY CHILLED WATER SUPPLY
SD	SINGLE DUCT/SMOKE DAMPER/SMOKE DETECTOR/STORM DRAIN
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SENS	SENSIBLE COOLING
SERV	SERVICE
SF	SQUARE FEET/SQUARE FOOT
SHR	SECONDARY HOT WATER RETURN/SENSIBLE HEAT RATIO
SHS	SECONDARY HOT WATER SUPPLY
SI	SOLIDS INTERCEPTOR
SL	SLEEVE/SLOPE
SP	SPRINKLER PIPING/STATIC PRESSURE
SPEC	SPECIFICATION
SPSS	STATIC PRESSURE SENSING STATION
SQ	SQUARE
SS	SERVICE SINK/STAINLESS STEEL
SST	SATURATION SUCTION TEMPERATURE
SSW	SUPPLEMENTAL STORM WATER
STD	STANDARD
STL	STEEL
STM	STEAM
STR	STRUCTURAL
SUCT	SUCTION
SUP	SUPPLY
SUSP	SUSPEND/SUSPENDED
SV	SECTION VALVE
SW	STORM WATER
SYS	SYSTEM
T	TEMPERATURE SENSOR/THERMOSTAT
T&B	TOP AND BOTTOM
TC	TOP OF CURB
TEMP	TEMPERATURE/TEMPORARY
TERM	TERMINAL
TP	TOTAL PRESSURE
TRANS	TRANSFER
TSP	TOTAL STATIC PRESSURE
TU	TERMINAL UNIT
TV	TEMPERING VALVE
TYP	TYPICAL
UG	UNDERGROUND
UH	UNIT HEATER
UV	ULTRAVIOLET
V	VACUUM/VALVE/VENT/VOLTS
VAR	VARIABLE/VARIES
VAV	VARIABLE AIR VOLUME
VCP	VITRIFIED CLAY PIPE
VEL	VELOCITY
VERT	VERTICAL
VOL	VOLUME
VSD	VARIABLE SPEED DRIVE
VTR	VENT THROUGH ROOF
VV	VAPOR VENT
W	WASTE/WATER/WATTS/WEST/WIDTH
W/	WITH
W/O	WITHOUT
WB	WET BULB
WC	WATER CLOSET/WATER COLUMN/WHEELCHAIR ACCESSIBLE
WG	WATER GAGE
WH	WALL HYDRANT/WATER HEATER
WPD	WATER PRESSURE DROP
WSHPU	WATER SOURCE HEAT PUMP UNIT
WT	WEIGHT
WTR	WATER
X#RET	X PSIG STEAM
X#STM	X PSIG CONDENSATE RETURN
YD	YARD
YR	YEAR

GENERAL NOTES: (APPLICABLE TO ALL MECHANICAL DRAWINGS)

1. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE TAKEN FROM RECORD DRAWINGS. CONTRACTOR SHALLDETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. REPAIR ALL DAMAGES OCCASIONED BY FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
2. RUN ALL DRAIN PIPING WITH 2 PERCENT MINIMUM GRADE UNLESS OTHERWISE NOTED. HORIZONTAL VENT PIPING SHALL BE GRADED TO DRIP BACK TO THE SOIL OR WASTE PIPE BY GRAVITY.
3. ELEVATIONS NOTED ARE TO CENTERLINES OF PIPES FOR ALL PRESSURE LINES AND TO INVERT FOR ALL GRAVITY FLOW LINES.
4. PROVIDE AN AIR VENT AT THE TOP OF ALL RISERS AND AT THE HIGH POINT OF EACH DROP IN THE HEATING GLYCOL AND CHILLED WATER SYSTEM.
5. PITCH DOWN ALL STEAM AND CONDENSATE RETURN MAINS 1-INCH (25 mm) IN 40 FEET (12 m) IN THE DIRECTION OF FLOW.
6. PITCH UP ALL STEAM AND CONDENSATE RUNOUTS TO RISERS AND EQUIPMENT AT 4 PERCENT GRADE. WHERE THIS PITCH CANNOT BE OBTAINED, RUNOUTS OVER 8 FEET (2500 mm) IN LENGTH SHOULD BE ONE SIZE LARGER THAN NOTED. RUNOUT AND RISER CONNECTIONS SHALL BE FROM THE TOP OF THE HORIZONTAL MAIN WITH A VERTICAL OR 45 DEGREE CONNECTION.
7. PROVIDE AN END OF MAIN DRIP AT EACH RISE IN THE STEAM MAIN. PROVIDE CONDENSATE DRIPS AT THE BOTTOM OF ALL STEAM RISERS AND DOWN FED RUNOUTS TO EQUIPMENT, RADIATION, ETC., AND AHEAD OF ALL CONTROL VALVES.
8. UNLESS OTHERWISE NOTED, ALL PIPING AND DUCTWORK IS OVERHEAD, TIGHT TO UNDERSIDE OF SLAB, WITH SPACE FOR INSULATION IF REQUIRED.
9. INSTALL PIPING AND DUCTWORK SO THAT ALL VALVES AND DAMPERS ARE ACCESSIBLE.
10. COORDINATE ALL MECHANICAL WORK WITH ELECTRICAL WORK, ETC., SHOWN ON OTHER DRAWINGS.
11. EXCEPT AS OTHERWISE NOTED, LOCATE ALL ROOM TEMPERATURE SENSORS 48 INCHES. ABOVE FINISHED FLOOR ON SAME HORIZONTAL CENTERLINE AS LIGHT SWITCH. WHERE LIGHT SWITCH AND TEMPERATURE SENSOR ARE NEXT TO EACH OTHER, LIGHT SWITCH SHALL BE CLOSEST TO THE DOOR. COORDINATE WITH ELECTRICAL CONTRACTOR. NOTIFY THE ENGINEER OF ANY ROOMS WHERE THE ABOVE LOCATION CANNOT BE MAINTAINED OR WHERE THERE IS A QUESTION ON LOCATION.
12. MAINTAIN MINIMUM 6'-8" (2000 mm) CLEARANCE TO UNDERSIDE OF PIPES, DUCTS, CONDUITS, SUSPENDED EQUIPMENT, ETC., THROUGHOUT ACCESS ROUTES IN MECHANICAL AND ELECTRICAL ROOMS.
13. CERTAIN ITEMS SUCH AS ACCESS DOORS, CLEANOUTS, RISE AND DROPS IN DUCTWORK AND PIPING, ETC., ARE INDICATED ON THE DRAWINGS FOR CLARITY OR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THESE ITEMS AS REQUIRED ELSEWHERE IN THE CONTRACT DOCUMENTS.
14. WHERE THE INSTALLATION OF NEW SERVICES OR THE EXTENSION OF EXISTING SERVICES REQUIRE CUTTING OF EXISTING FLOORS, WALLS, PARTITIONS, ETC., IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CHECK FOR THE PRESENCE OF EXISTING MECHANICAL AND/OR ELECTRICAL SERVICES WITHIN OR IMMEDIATELY BENEATH CONSTRUCTION AND EXERCISE NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO THE SERVICES OR INJURY TO HIS PERSONNEL DUE TO CONTACT WITH SAME. WHERE PRACTICAL, SUCH EXISTING SERVICES SHALL BE TEMPORARILY DISCONNECTED DURING THE CUTTING OPERATION. SUCH OUTAGES IN SERVICE SHALL BE SCHEDULED IN ADVANCE WITH THE OWNER.
15. FLOW SCHEMATIC AND RISER DIAGRAMS INDICATE FLOW AND OPERATION CONCEPTS AS WELL AS GENERAL ARRANGEMENT OF EQUIPMENT. VALVES, PRESSURE GAUGES, ETC. ARE INDICATED FOR THIS PURPOSE. ADDITIONAL VALVES, PRESSURE GAUGES, ETC. SHALL BE PROVIDED AS SHOWN ON VARIOUS EQUIPMENT DETAILS. SEE PLANS AND DETAILS FOR PIPE SIZES NOT INDICATED ON FLOW SCHEDULES AND RISER DIAGRAMS.
16. CONTRACTOR SHALL RECYCLE ALL MERCURY SWITCH THERMOSTATS THAT ARE REMOVED. RECYCLED THERMOSTATS SHALL BE DELIVERED TO PARTICIPATING WHOLESALERS.
17. CONTRACTOR SHALL BE RESPONSIBLE FOR RESEARCHING ALL SYSTEMS THAT A PARTICULAR OUTAGE WILL AFFECT AS WELL AS LOCATING ALL SHUTOFF POINTS. THIS INFORMATION SHALL BE INCLUDED IN THE OUTAGE PLAN TO BE SUBMITTED TO VA FACILITIES DEPARTMENT FOR APPROVAL.
18. EXISTING SYSTEMS SHOWN TO BE REMOVED ON DEMOLITION DRAWINGS SHALL BE REMOVED BACK TO MAINS. NO SYSTEM SHALL BE ABANDONED IN PLACE.
19. OCCUPIED AREAS ARE REQUIRED TO MAINTAIN HEATING AND COOLING DURING CONSTRUCTION AT CONTRACTOR'S EXPENSE.
20. HOT WOARK REQUIRES A DAILY PERMIT FROM THE LOCAL FIRE DEPARTMENT. CONTACT 410-642-2111 X5930 TWO HOURS IN ADVANCE IF POSSIBLE. SEE PROVIDED SAMPLE PERMIT.
21. PROTECT ALL UNDERGROUND PIPING CUT DURING CONSTRUCTION FOR TIE-IN. ANY INFILTRATION OF DIRT OR OTHER DEBRIS INTO PIPING SHALLB E REMOVED OR PIPING CORRECTED AT CONTRACTOR'S EXPENSE.
22. ANY ABANDONED PIPING MUST BE CAPPED AT BOTH ENDS OR REMOVED COMPLETELY.

FULLY SPRINKLERED

Additions:	Date

Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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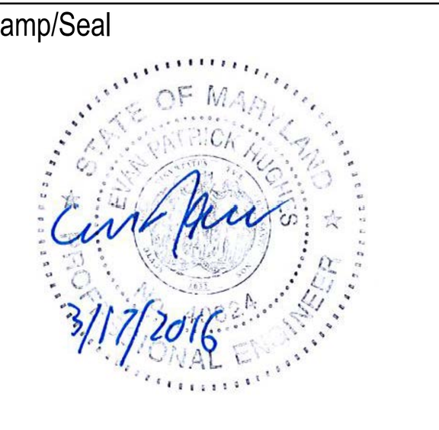


Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 40828, Expiration Date: 6/15/2017

Approved:

Approved: Chief, Facilities and Engineering

Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: MECHANICAL COVER SHEET

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WARAHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360

Checked: EPH

Drawn: MJF

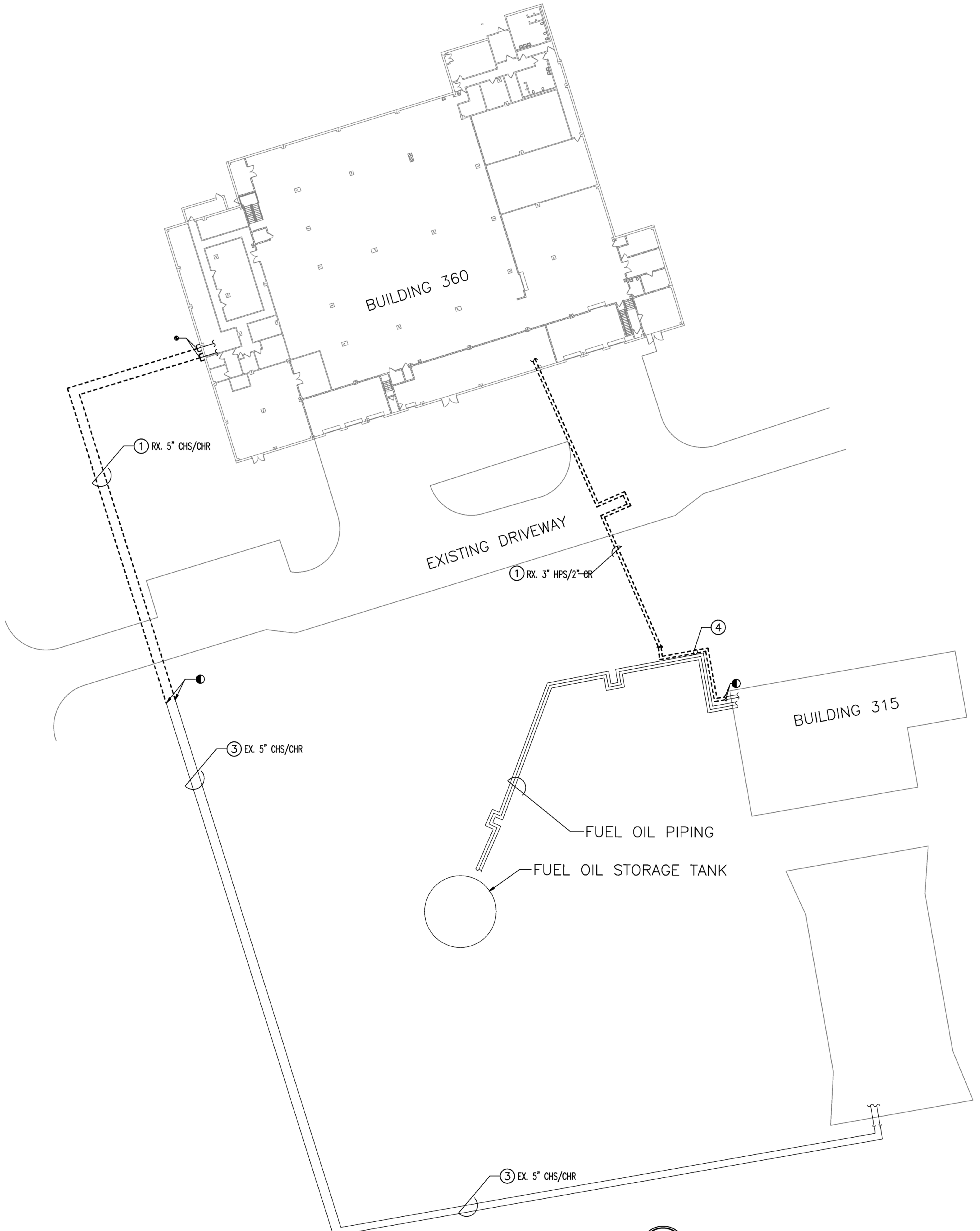
Location: PERRY POINT, MD

Date: 03/17/16

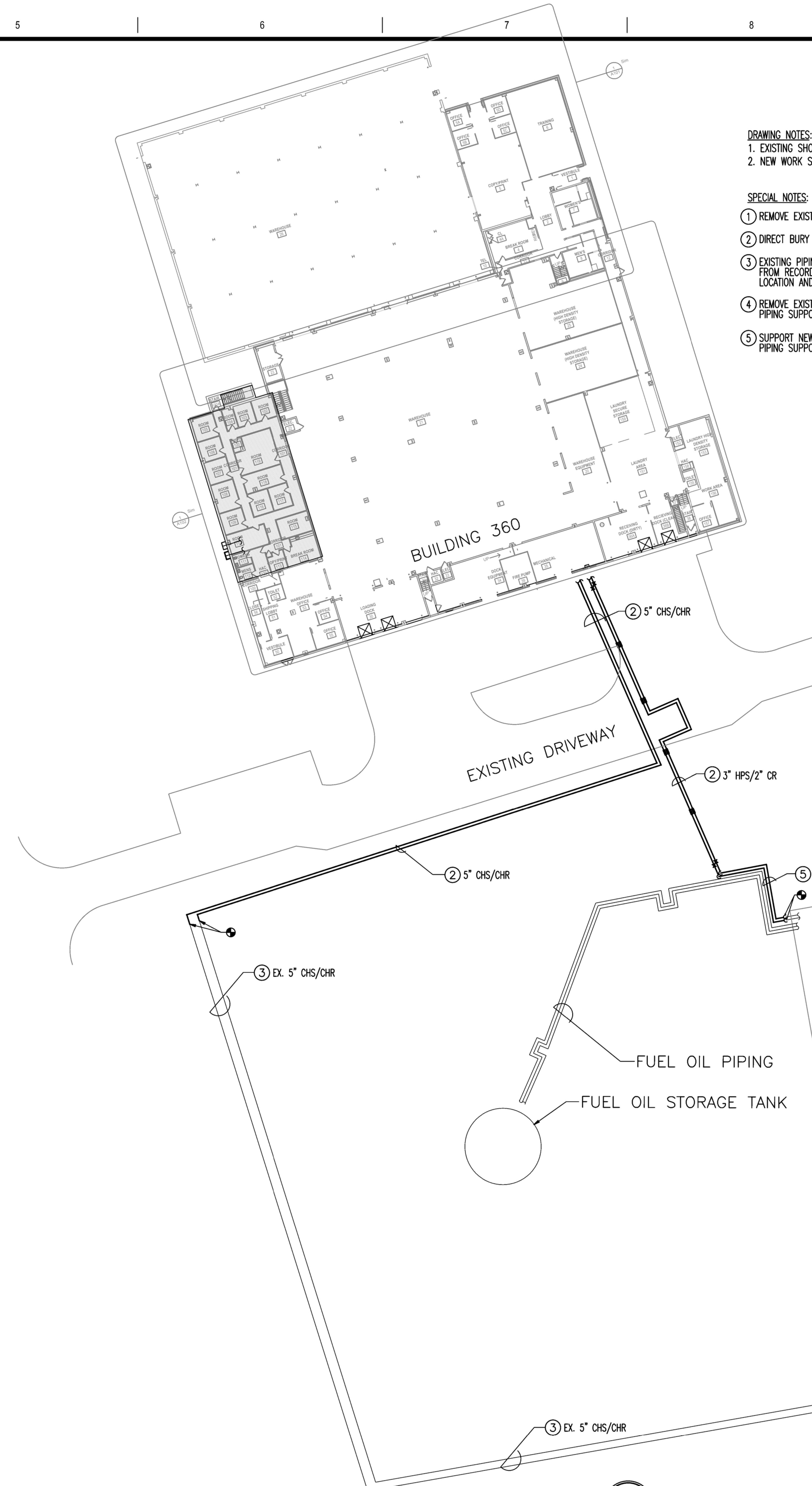
VA Project Number: 512-530

Drawing Number: M001

DEPARTMENT OF VETERANS AFFAIRS



1 SITE PLAN - MECHANICAL PIPING - REMOVAL
SCALE: 1"=30'



2 SITE PLAN - MECHANICAL PIPING - NEW WORK
SCALE: 1"=30'

DRAWING NOTES: (APPLICABLE TO THIS DRAWING ONLY)
1. EXISTING SHOWN WITH LIGHT WEIGHT LINE.
2. NEW WORK SHOWN WITH HEAVY WEIGHT LINE.

SPECIAL NOTES: (APPLICABLE TO THIS DRAWING ONLY)
1. REMOVE EXISTING BURIED PIPING TO POINT INDICATED AND CAPPED.
2. DIRECT BURY PIPING IN ACCORDANCE WITH SPECIFICATION.
3. EXISTING PIPING LOCATED BELOW GRADE. LOCATION TAKEN FROM RECORD DRAWINGS. CONTRACTOR SHALL FIELD VERIFY LOCATION AND NOTIFY ENGINEER OF ANY DISCREPANCY.
4. REMOVE EXISTING ABOVE GROUND PIPING. MAINTAIN EXISTING PIPING SUPPORT RACKS.
5. SUPPORT NEW STEAM PIPING ABOVE GRADE FROM EXISTING PIPING SUPPORT RACKS.

1" = 30' — 0 15 30 60 90 FT

FULLY SPRINKLERED

Additions:	Date

Revisions:	Date
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License No. 40828, Expiration Date: 07/19/2017

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Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: MECHANICAL - SITE PLAN

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360

Checked: EPH

Drawn: MJF

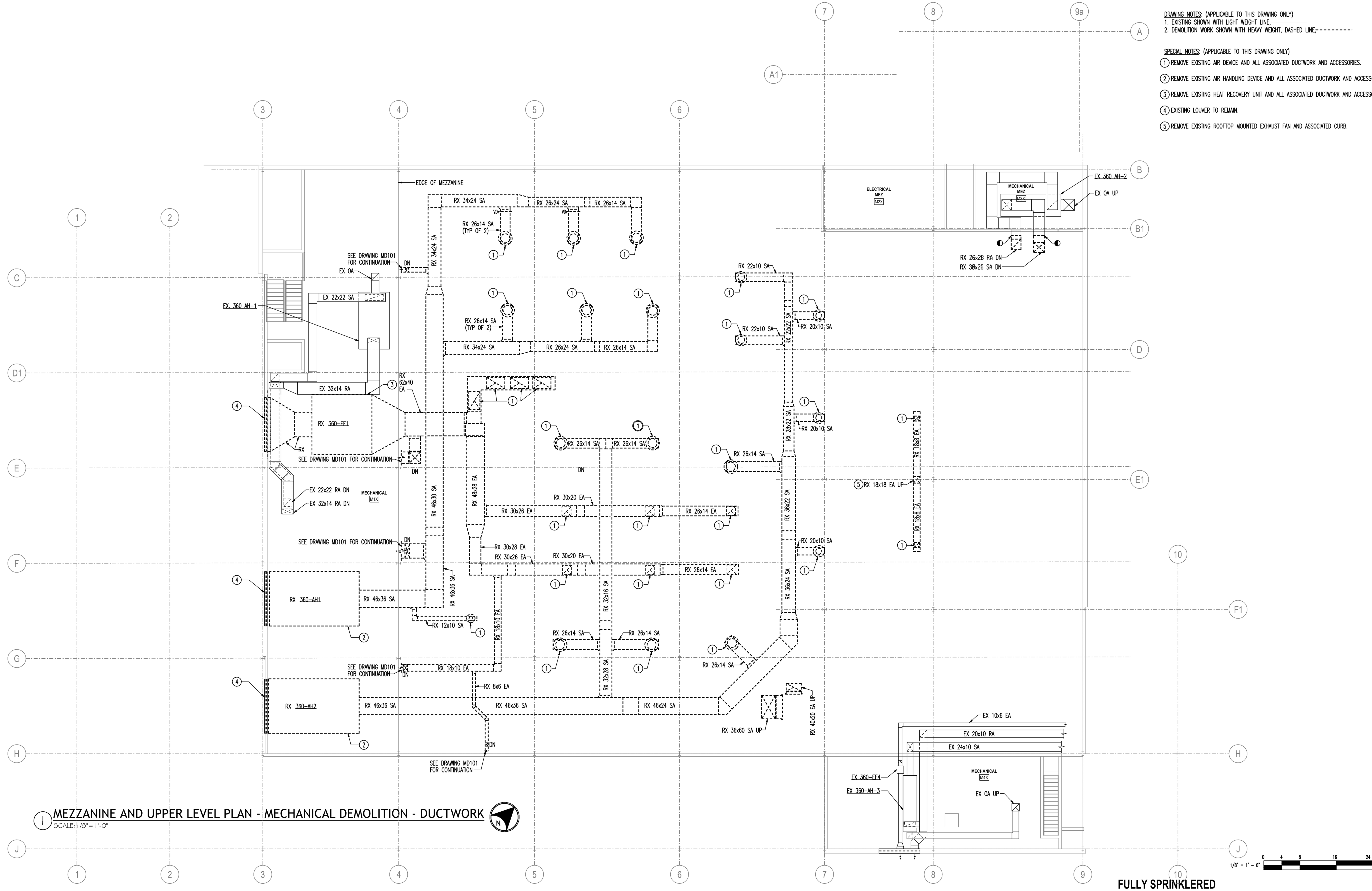
Location: PERRY POINT, MD

Date: 03/17/16

VA Project Number: 512-530

Drawing Number: M002

DEPARTMENT OF VETERANS AFFAIRS



DRAWING NOTES: (APPLICABLE TO THIS DRAWING ONLY)
1. EXISTING SHOWN WITH LIGHT WEIGHT LINE.
2. DEMOLITION WORK SHOWN WITH HEAVY WEIGHT, DASHED LINE.

SPECIAL NOTES: (APPLICABLE TO THIS DRAWING ONLY)
(1) REMOVE EXISTING AIR DEVICE AND ALL ASSOCIATED DUCTWORK AND ACCESSORIES.
(2) REMOVE EXISTING AIR HANDLING DEVICE AND ALL ASSOCIATED DUCTWORK AND ACCESSORIES.
(3) REMOVE EXISTING HEAT RECOVERY UNIT AND ALL ASSOCIATED DUCTWORK AND ACCESSORIES.
(4) EXISTING LOUVER TO REMAIN.
(5) REMOVE EXISTING ROOFTOP MOUNTED EXHAUST FAN AND ASSOCIATED CURB.

1 MEZZANINE AND UPPER LEVEL PLAN - MECHANICAL DEMOLITION - DUCTWORK

SCALE: 1/8" = 1'-0"

FULLY SPRINKLERED

Additions:	Date

Revisions:	Date
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DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
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Stamp/Seal

3/17/2016

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 40828, Expiration Date: 07/5/2017

Approved:

Approved: Chief, Facilities and Engineering

Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: GROUND FLOOR AND MEZZANINE - MECHANICAL DEMOLITION - HVAC

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360

Checked: EPH

Drawn: MJF

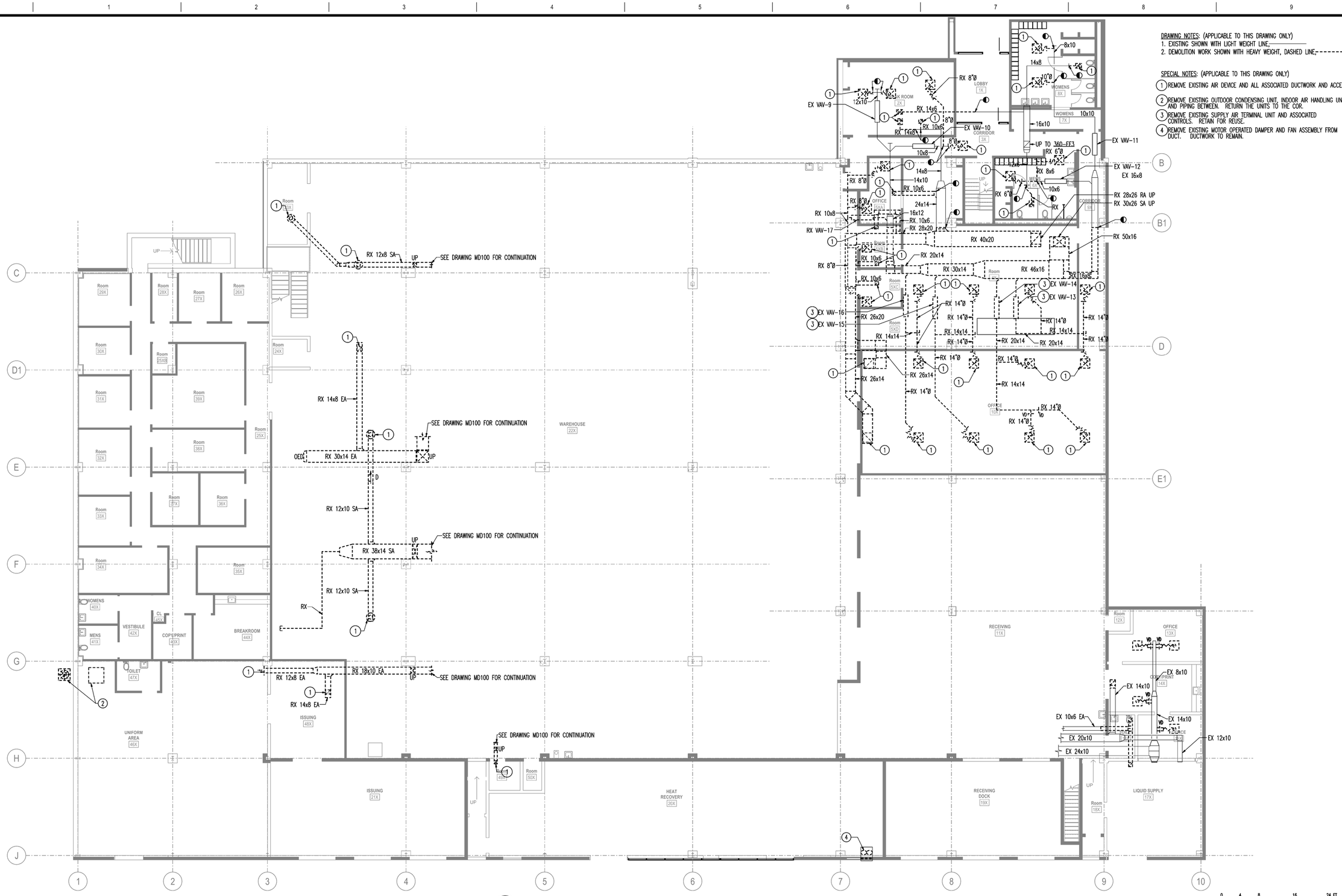
Location: PERRY POINT, MD

Date: 03/17/16

VA Project Number: 512-530

Drawing Number: MD100

DEPARTMENT OF VETERANS AFFAIRS



GROUND FLOOR PART PLAN - MECHANICAL DEMOLITION

SCALE: 1/8" = 1'-0"

FULLY SPRINKLERED

Additions:	Date
Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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Stamp/Seal

STATE OF MARYLAND — CURTIS PEACOCK — REGISTERED PROFESSIONAL ENGINEER — SEAL
3/17/2016

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 40808 Expiration Date: 09/30/2017

Approved:	Approved: Chief, Facilities and Engineering
	Approved: Associate Chief for Maintenance And Operations, Perry Point
	Approved: Engineering Projects Supervisor
	Approved: Infection Control Officer

Approved: Associate Director for Operations

Approved: Director, Medical Center

Drawing Title: GROUND FLOOR PART PLAN - MECHANICAL DEMOLITION - HVAC

Project Title: WAREHOUSE RENOVATION & EXPANSION

Date: 03/17/16

VA Project Number: 512-530

Scale

Building Number: 360

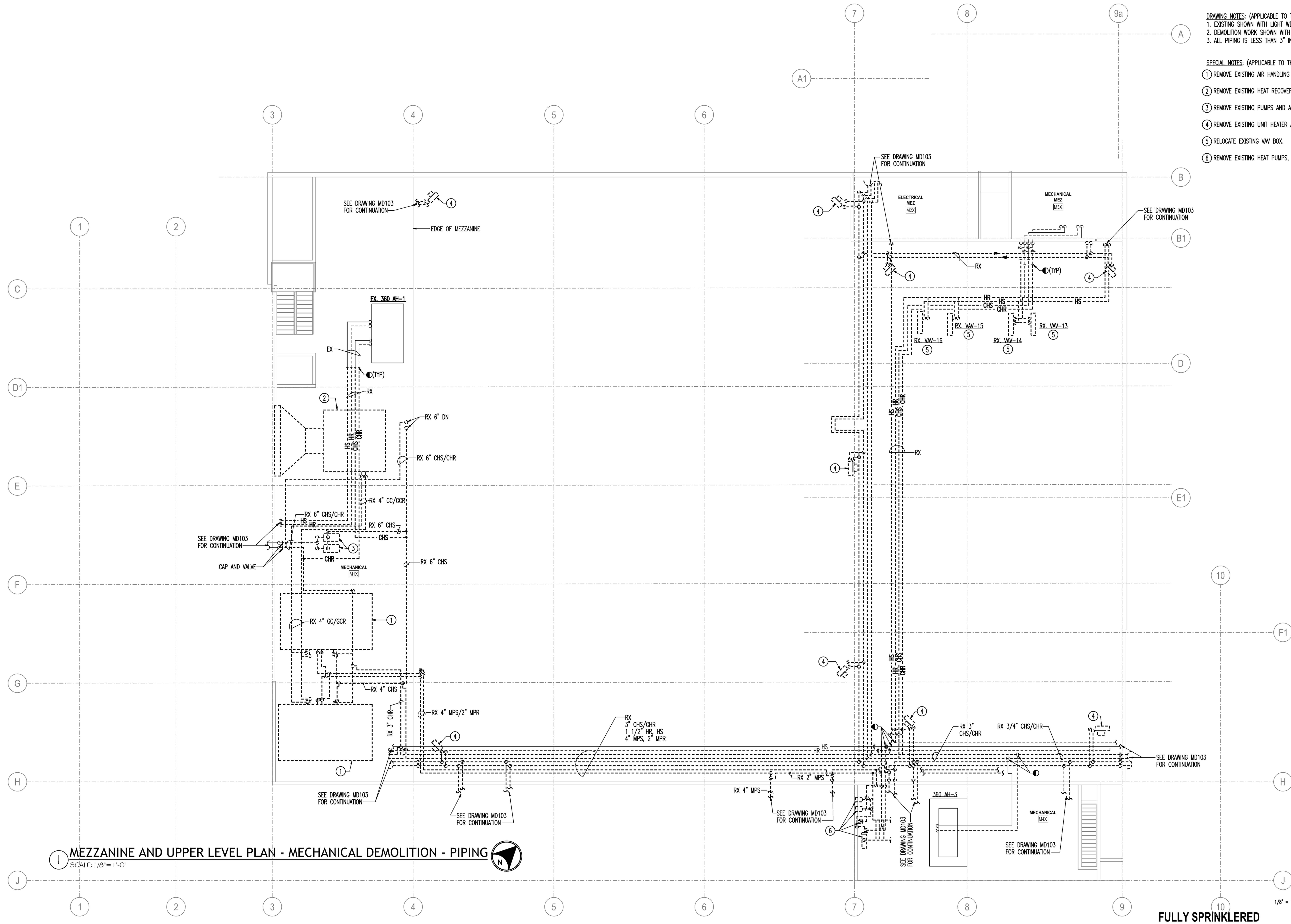
Checked: EPH

Drawn: MJF

Drawing Number: MD101

Location: PERRY POINT, MD

DEPARTMENT OF VETERANS AFFAIRS



MEZZANINE AND UPPER LEVEL PLAN - MECHANICAL DEMOLITION - PIPING
SCALE: 1/8" = 1'-0"

DRAWING NOTES: (APPLICABLE TO THIS DRAWING ONLY)
1. EXISTING SHOWN WITH LIGHT WEIGHT LINE.
2. DEMOLITION WORK SHOWN WITH HEAVY WEIGHT, DASHED LINE.
3. ALL PIPING IS LESS THAN 3" IN DIAMETER UNLESS OTHERWISE NOTED.

SPECIAL NOTES: (APPLICABLE TO THIS DRAWING ONLY)
(1) REMOVE EXISTING AIR HANDLING UNIT AND ALL ASSOCIATED PIPING AND ACCESSORIES.
(2) REMOVE EXISTING HEAT RECOVERY UNIT AND ALL ASSOCIATED PIPING AND ACCESSORIES.
(3) REMOVE EXISTING PUMPS AND ALL ASSOCIATED PIPING AND ACCESSORIES.
(4) REMOVE EXISTING UNIT HEATER AND ALL ASSOCIATED PIPING AND ACCESSORIES.
(5) RELOCATE EXISTING VAV BOX.
(6) REMOVE EXISTING HEAT PUMPS, HEAT EXCHANGERS AND ASSOCIATED PIPING AND SPECIALTIES.

FULLY SPRINKLERED

Additions:	Date
Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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Stamp/Seal
STATE OF MARYLAND — PROFESSIONAL ENGINEER
3/17/2016

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 40828, Expiration Date: 07/09/2017

Approved:

Approved: Chief, Facilities and Engineering

Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: GROUND FLOOR AND MEZZANINE - MECHANICAL DEMOLITION - PIPING

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale	Building Number	Checked	Drawn
	360	EPH	MJF

Location: PERRY POINT, MD

Date: 03/17/16

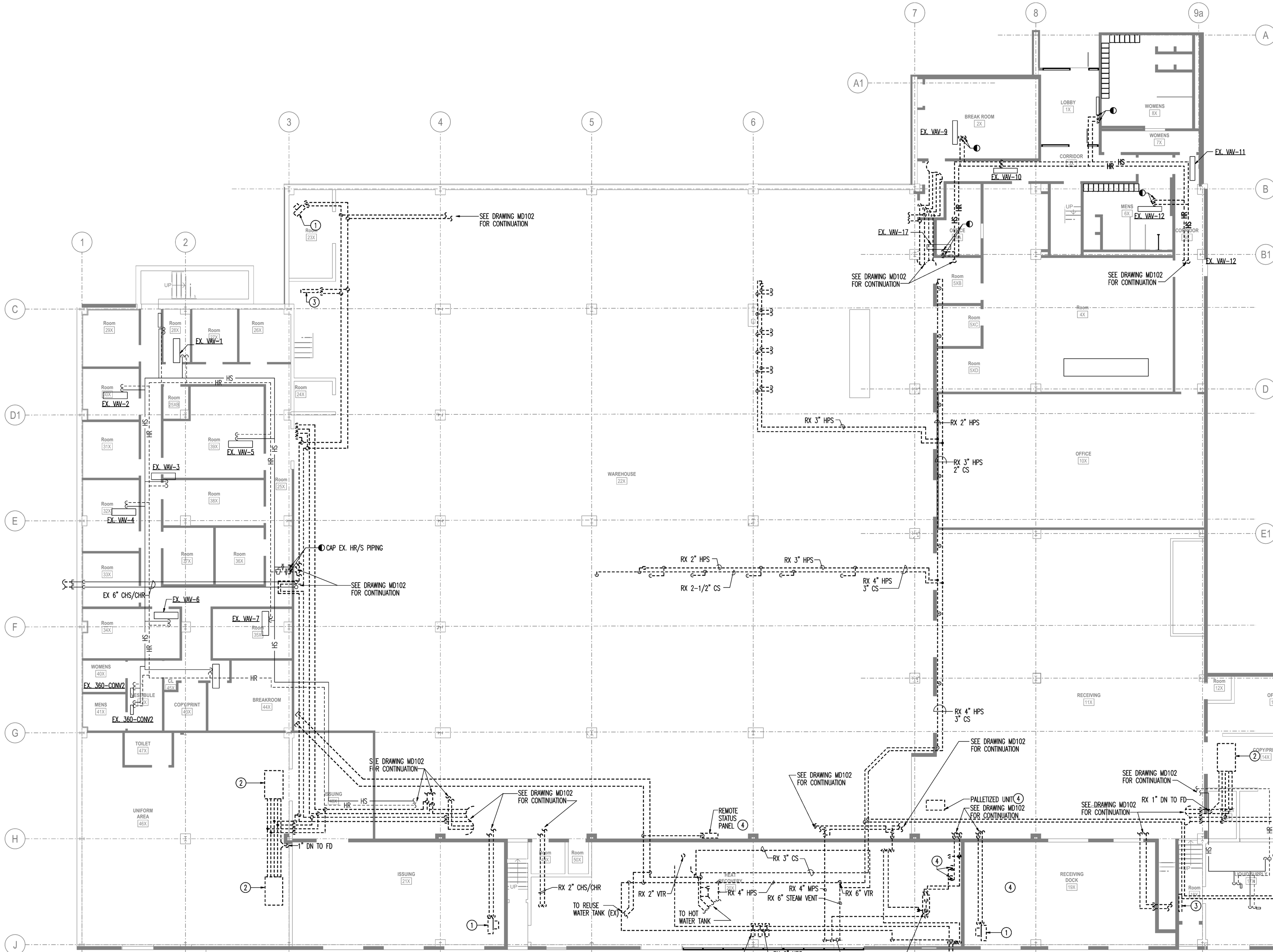
VA Project Number: 512-530

Drawing Number: MD102

DEPARTMENT OF VETERANS AFFAIRS

DRAWING NOTES: (APPLICABLE TO THIS DRAWING ONLY)
1. EXISTING SHOWN WITH LIGHT WEIGHT LINE.
2. DEMOLITION WORK SHOWN WITH HEAVY WEIGHT, DASHED LINE.
3. ALL PIPING IS LESS THAN 3" IN DIAMETER UNLESS OTHERWISE NOTED.

SPECIAL NOTES: (APPLICABLE TO THIS DRAWING ONLY)
(1) REMOVE EXISTING UNIT HEATER AND ALL ASSOCIATED PIPING AND ACCESSORIES.
(2) REMOVE EXISTING FAN COIL UNIT AND ALL ASSOCIATED PIPING AND ACCESSORIES.
(3) REMOVE EXISTING CONVECTOR AND ALL ASSOCIATED PIPING AND ACCESSORIES.
(4) REMOVE EXISTING EQUIPMENT AND ALL ASSOCIATED PIPING AND ACCESSORIES.



GROUND FLOOR PART PLAN - MECHANICAL DEMOLITION - PIPING

SCALE: 1/8" = 1'-0"

1/8" = 1' - 0"   0 4 8 16 24 FT

FULLY SPRINKLERED

Additions:	Date
Revisions:	**Date**
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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3/17/2016

Approved:

Approved: Chief, Facilities and Engineering

Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: GROUND FLOOR PART PLAN - MECHANICAL DEMOLITION - PIPING

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360

Checked: EPH

Drawn: MJF

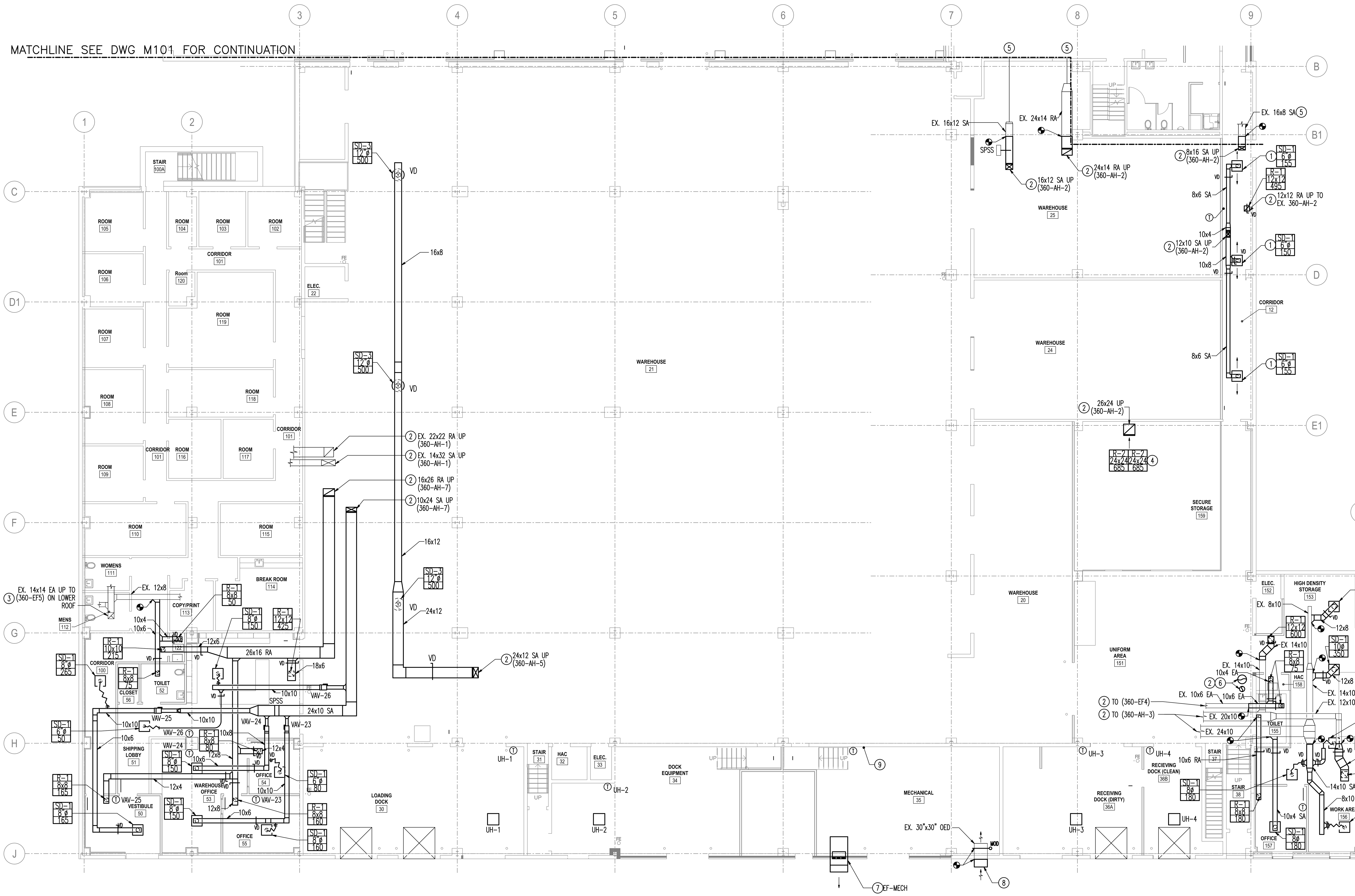
Location: PERRY POINT, MD

Date: 03/17/16

VA Project Number: 512-530

Drawing Number: MD103

DEPARTMENT OF VETERANS AFFAIRS



GROUND FLOOR PART PLAN SOUTH - MECHANICAL NEW WORK- DUCTWORK

SCALE: 1/8"= 1'-0"

DRAWING NOTES: (APPLICABLE TO THIS DRAWING ONLY)
1. EXISTING SHOWN WITH LIGHT WEIGHT LINE,
2. NEW WORK SHOWN WITH HEAVY WEIGHT LINE,

SPECIAL NOTES: (APPLICABLE TO THIS DRAWING ONLY)
1. PROVIDE DIFFUSERS WITH TWO-WAY BLOW PATTERN.
2. REFER TO MEZZANINE PLAN ON DRAWING M102 FOR CONTINUATION.
3. REFER TO ROOF MECHANICAL PLANS ON DRAWING M103 FOR CONTINUATION.
4. TERMINATE 26x24 DUCTWORK 12" ABOVE FINISHED FLOOR. PROVIDE TWO (2) 24x24 FILTER GRILLES STACKED VERTICALLY ON FACE OF DUCT. MOUNT BOTTOM OF LOWEST GRILLE 6" ABOVE BOTTOM OF DUCT. BASIS OF DESIGN: TITUS 350FLF2. PROVIDE MERV 3 FILTERS.
5. REFER TO GROUND FLOOR PART PLAN NORTH ON M101 FOR CONTINUATION.
6. 20"ø MAKE-UP AIR AND 12"ø EXHAUST AIR UP FROM DRYER EQUIPMENT. REFER TO MANUFACTURER'S INSTALLATION MANUAL FOR CONNECTION DETAILS.
7. MECHANICAL ROOM EXHAUST FAN. INSTALL AS HIGH AS PRACTICAL. REFER TO SCHEDULE, SPECIFICATION AND ATC FOR ADDITIONAL INFORMATION.
8. EXISTING MECHANICAL ROOM RELIEF AIR DUCT. PROVIDE BIRD SCREEN AND 45 DEGREE WEATHER HOOD AT INLET.
9. PROVIDE EMERGENCY AIR HANDLING UNIT SHUTDOWN PANEL.

1/8" = 1' - 0" (0, 4, 8, 16, 24 FT)

FULLY SPRINKLERED

Additions:	Date

Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: GROUND FLOOR PART PLAN - MECHANICAL NEW WORK - HVAC

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360

Checked: EPH

Drawn: MJF

Location: PERRY POINT, MD

Date: 03/17/16

VA Project Number: 512-530

Drawing Number: M100

DEPARTMENT OF VETERANS AFFAIRS

DRAWING NOTES: (APPLICABLE TO THIS DRAWING ONLY)
1. EXISTING SHOWN WITH LIGHT WEIGHT LINE.
2. NEW WORK SHOWN WITH HEAVY WEIGHT LINE.

SPECIAL NOTES: (APPLICABLE TO THIS DRAWING ONLY)

(1) REBALANCE EXISTING SUPPLY AIR TERMINAL UNIT. REFER TO SCHEDULE FOR ADDITIONAL INFORMATION.

(2) REFER TO ROOF MECHANICAL PLANS ON DRAWING M103 FOR CONTINUATION.

(3) SMOKE DETECTOR FOR UNIT SHUT-DOWN LOCATED IN VERTICAL DUCT BY FIRE PROTECTION DIVISION.

(4) WALL MOUNTED CIRCULATION FAN. COORDINATION INSTALLATION WITH RACK SYSTEM. PROVIDE FAN CONTROL PANEL AT ACCESSIBLE LOCATION WITH THE APPROVAL OF THE COR.

(5) PROVIDE 8"ø DUCT DOWN THROUGH CEILING TO PRINTING EQUIPMENT. CONNECT TO EQUIPMENT MOUNTED EXHAUST FAN WITH THIMBLE CONNECTION. BALANCE BRANCH FOR 200 CFM.

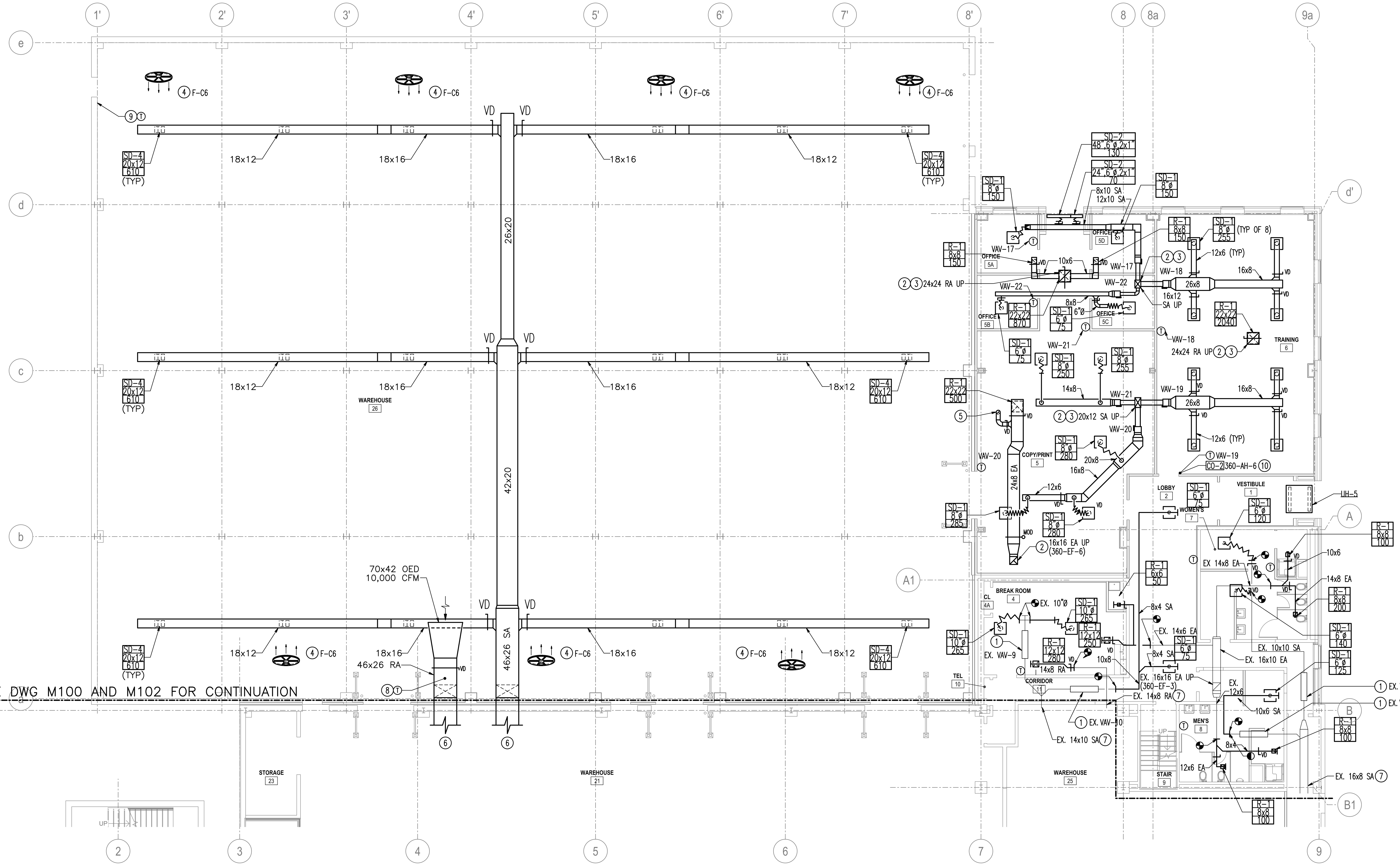
(6) REFER TO MEZZANINE PLAN ON DRAWING M102 FOR CONTINUATION.

(7) REFER TO GROUND FLOOR PART PLAN SOUTH ON DRAWING M100 FOR CONTINUATION.

(8) DUCT MOUNTED TEMPERATURE TRANSMITTER.

(9) MOUNT ROOM TEMPERATURE TRANSMITTER AT 48" ABOVE FINISHED FLOOR.

(10) MOUNT CARBON DIOXIDE TRANSMITTER AT 48" ABOVE FINISHED FLOOR.



GROUND FLOOR PART PLAN NORTH - MECHANICAL NEW WORK - DUCTWORK
SCALE: 1/8"= 1'-0"

1/8" = 1' - 0" (0, 4, 8, 16, 24 FT)

FULLY SPRINKLERED

Additions:	Date

Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: GROUND FLOOR PART PLAN - MECHANICAL NEW WORK - HVAC

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360

Checked: EPH

Drawn: MJF

Location: PERRY POINT, MD

Date: 03/17/16

VA Project Number: 512-530

Drawing Number: M101

DEPARTMENT OF VETERANS AFFAIRS

DRAWING NOTES: (APPLICABLE TO THIS DRAWING ONLY)
1. EXISTING SHOWN WITH LIGHT WEIGHT LINE,
2. NEW WORK SHOWN WITH HEAVY WEIGHT LINE,

SPECIAL NOTES: (APPLICABLE TO THIS DRAWING ONLY)

(1) RELOCATE EXISTING SUPPLY AIR TERMINAL UNIT TO THIS LOCATION. REFER TO SCHEDULE FOR FURTHER INFORMATION.

(2) PROVIDE OPEN END DUCT WITH BIRDSCREEN OF THE SIZE INDICATED ON PLAN.

(3) CONTRACTOR SHALL COORDINATE BUILDING PENETRATION WITH EXISTING STEEL STRUCTURE. REFER TO GROUND FLOOR PART PLAN NORTH ON DRAWING M101 FOR CONTINUATION.

(4) REFER TO GROUND FLOOR PART PLAN SOUTH ON DRAWING M100 FOR CONTINUATION.

(5) WALL MOUNTED CIRCULATION FAN. COORDINATE INSTALLATION WITH RACK SYSTEM. PROVIDE CONTROL WIRING TO FAN MULTI-FAN CONTROL MODULE.

(6) CONTRACTOR SHALL UTILIZE EXISTING OUTDOOR AIR LOUVER AND REPLACE INSULATION AROUND EXISTING LOUVER BODY AND NEW PLENUM AS PER SPECIFICATION.

(7) CONTRACTOR SHALL UTILIZE EXISTING RELIEF AIR LOUVER. PROVIDE OED WITH SAME WIDTH AND HEIGHT AS LOUVER. COVER OED WITH BIRDSCREEN.

(8) EXISTING EXHAUST FAN. CONTRACTOR SHALL ADJUST SHEAVE PACKAGE OR PROVIDE NEW SHEAVE PACKAGE TO ACHIEVE SCHEDULED AIRFLOW. TEST FAN TO ENSURE PROPER PERFORMANCE ONCE ADJUSTMENTS ARE MADE.

(9) LOCATE VSMC SERVING 360-AH-6 WITHIN EXISTING MEZZANINE.

(10) REFER TO REBALANCE SCHEDULE FOR ADDITIONAL INFORMATION.

(11) DUCT MOUNTED TEMPERATURE TRANSMITTER.

(12) MOUNT ROOM TEMPERATURE TRANSMITTER AT 48" ABOVE FINISHED FLOOR.

(13) PROVIDE MULTI-FAN CONTROL MODULE FOR CIRCULATION FANS WITHIN NEW WAREHOUSE SPACE. EXTEND CONTROL WIRING TO NEW CIRCULATION FAN LOCATIONS. MOUNT TOP OF PANEL 60" ABOVE FINISHED FLOOR.

(14) PROVIDE MULTI-FAN CONTROL MODULE FOR CIRCULATION FANS WITHIN EXISTING WAREHOUSE SPACE. EXTEND CONTROL WIRING TO NEW CIRCULATION FAN LOCATIONS. MOUNT TOP OF PANEL 60" ABOVE FINISHED FLOOR.

(15) 20"ø MAKE-UP AIR FOR DRYER EQUIPMENT. SEE MECHANICAL ROOF PLANS FOR CONTINUATION.

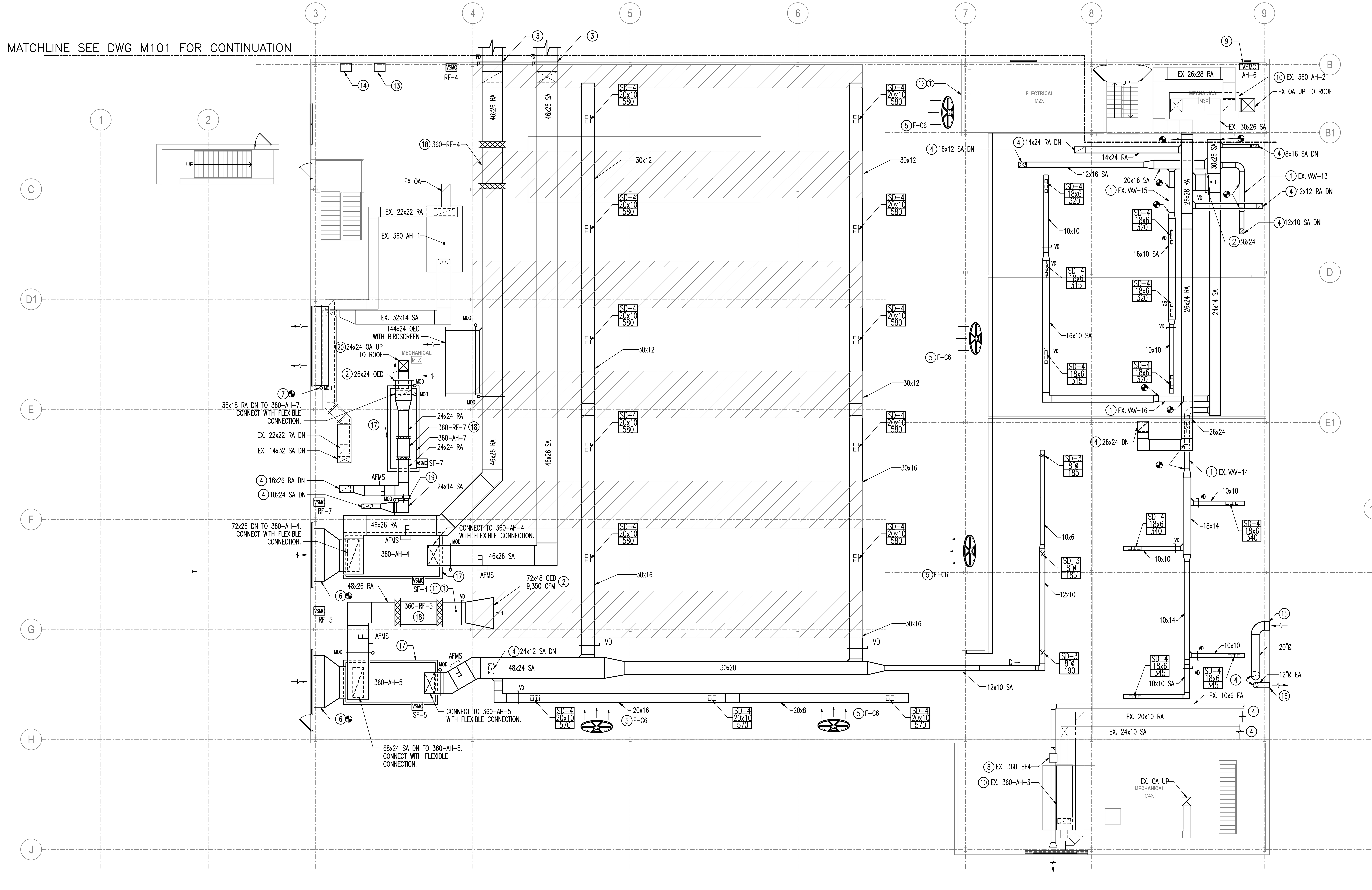
(16) 12"ø EXHAUST AIR FOR DRYER EQUIPMENT. SEE MECHANICAL ROOF PLANS FOR CONTINUATION.

(17) MOUNT NEW AIR HANDLING UNIT ON NEW HOUSEKEEPING PAD. COORDINATE WITH ARCHITECTURAL PLANS.

(18) SUPPORT FROM STRUCTURE ABOVE.

(19) PROVIDE AIRFLOW MONITORING STATION IN STRAIGHT RUN OF 24x14 SA DUCTWORK BELOW.

(20) PROVIDE AIRFLOW MONITORING STATION IN VERTICAL RUN OF 24x24 OA.



MEZZANINE- MECHANICAL NEW WORK- DUCTWORK
SCALE: 1/8"= 1'-0"

1/8" = 1' - 0" 0 4 8 16 24 FT

FULLY SPRINKLERED

Additions:	Date

Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
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Approved:

Approved: Chief, Facilities and Engineering

Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: MEZZANINE PART PLAN - MECHANICAL NEW WORK HVAC

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360 | Checked: EPH | Drawn: MJF

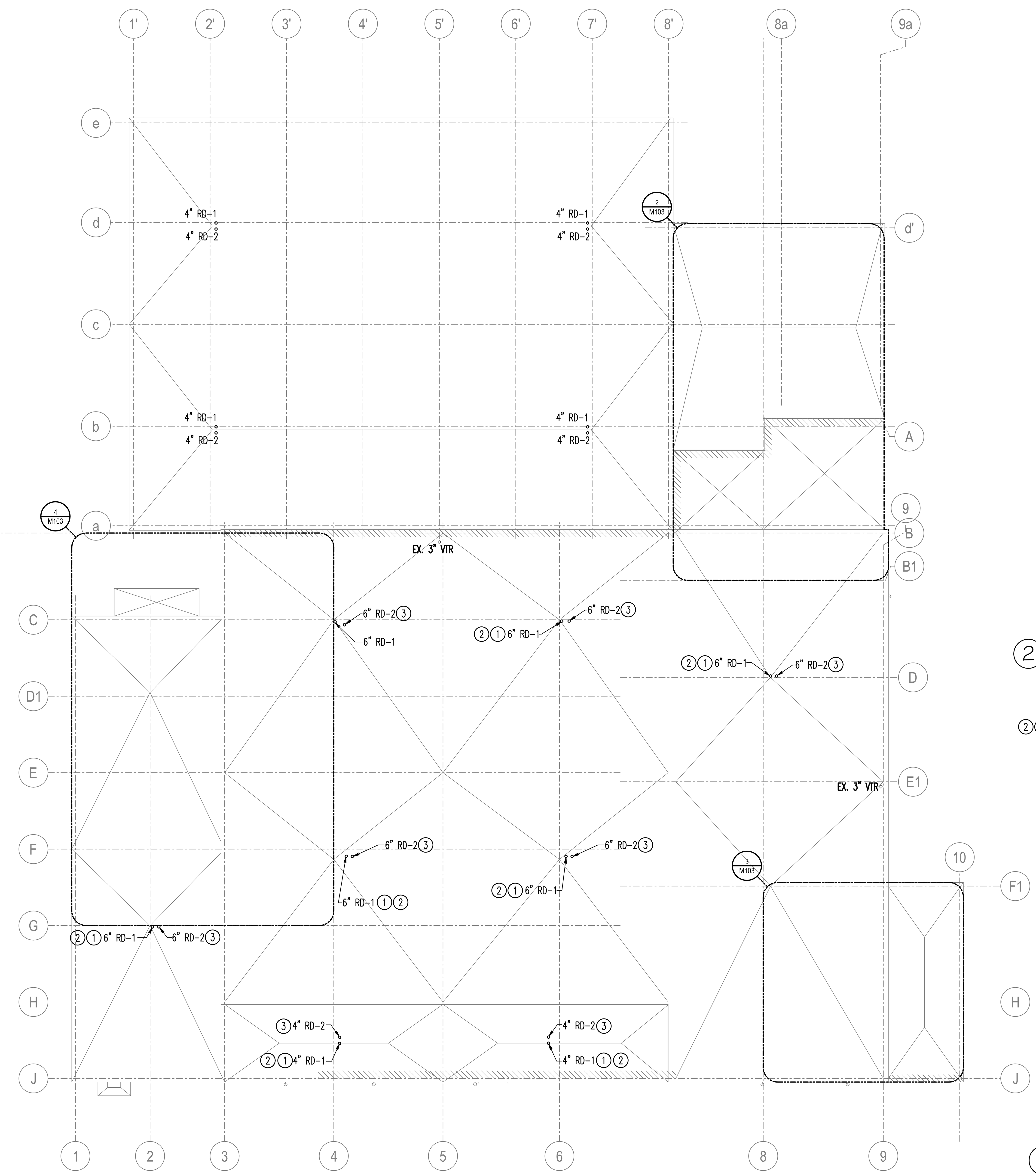
Location: PERRY POINT, MD

Date: 03/17/16

VA Project Number: 512-530

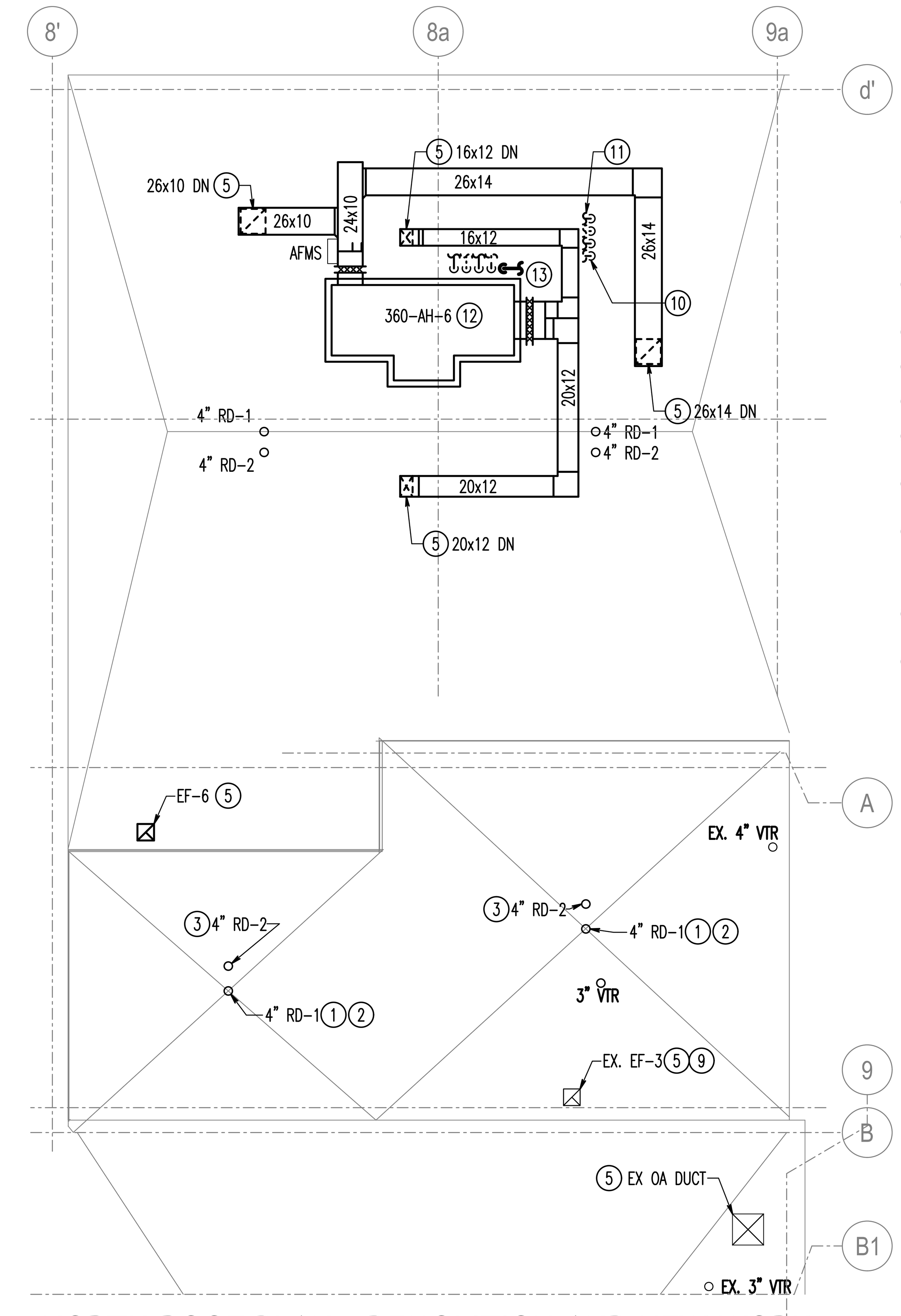
Drawing Number: M102

DEPARTMENT OF VETERANS AFFAIRS



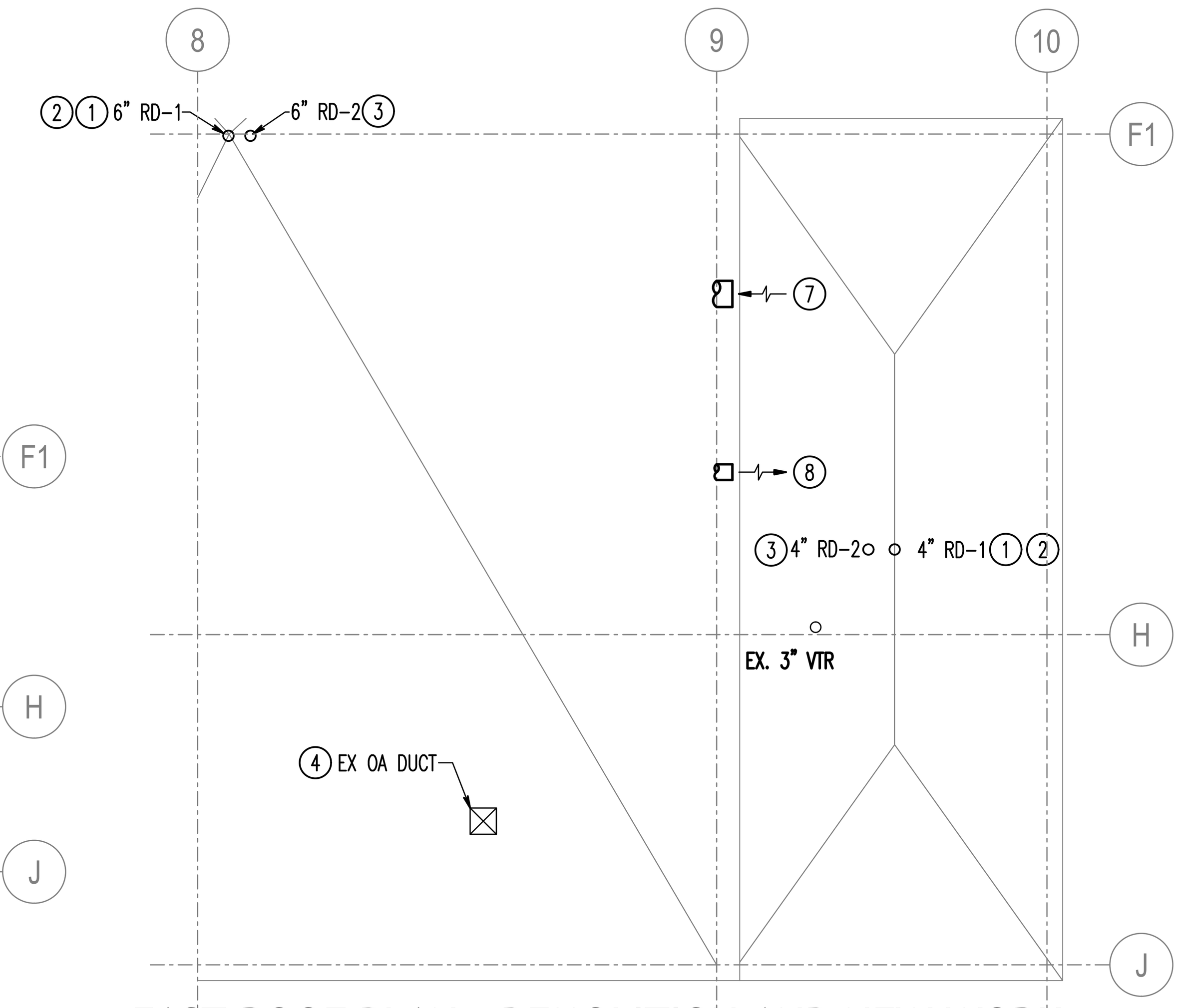
(1) MECHANICAL ROOF PLAN - DEMOLITION AND NEW WORK

SCALE: 1/16"= 1'-0"



(2) NORTH ROOF PLAN - DEMOLITION AND NEW WORK

SCALE: 1/8"= 1'-0"



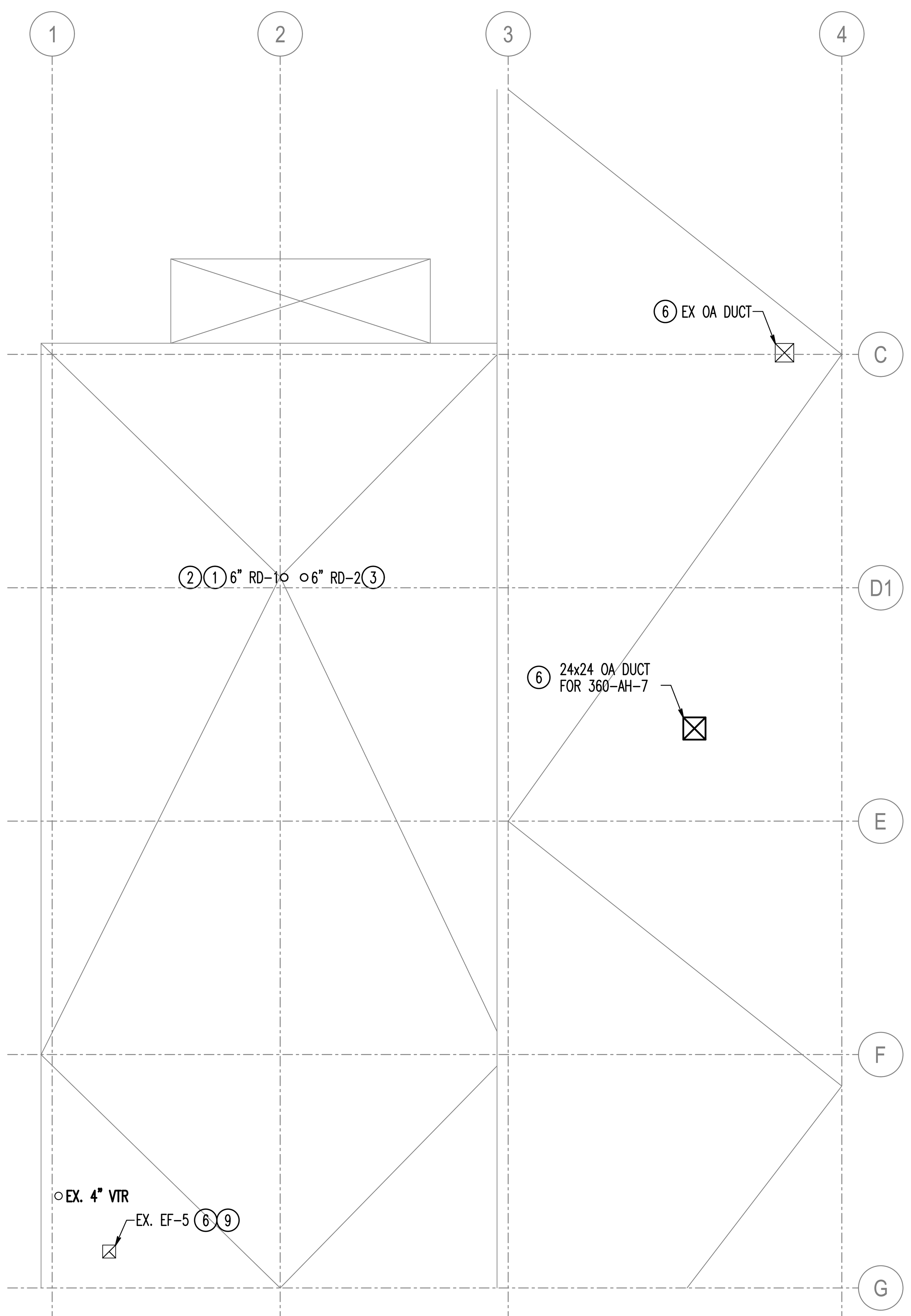
(3) EAST ROOF PLAN - DEMOLITION AND NEW WORK

SCALE: 1/8"= 1'-0"

DRAWING NOTES: (APPLICABLE TO THIS DRAWING ONLY)
1. EXISTING SHOWN WITH LIGHT WEIGHT LINE,
2. NEW WORK SHOWN WITH HEAVY WEIGHT LINE,

SPECIAL NOTES: (APPLICABLE TO THIS DRAWING ONLY)

(1) CONTRACTOR SHALL REMOVE EXISTING ROOF DRAIN.
(2) CONTRACTOR SHALL PROVIDE NEW ROOF DRAIN. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
(3) CONTRACTOR SHALL PROVIDE NEW SECONDARY ROOF DRAIN. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
(4) REFER TO MEZZANINE PLAN ON DRAWING M102 FOR CONTINUATION.
(5) REFER TO GROUND FLOOR PLAN ON DRAWING M101 FOR CONTINUATION.
(6) REFER TO GROUND FLOOR PLAN ON DRAWING M100 FOR CONTINUATION.
(7) 20"ø MAKE-UP AIR WALL PENETRATION ALONG SIDE OF MEZZANINE WALL FOR DRYER EQUIPMENT. REFER TO M102 FOR CONTINUATION.
(8) 12"ø EXHAUST AIR WALL PENETRATION ALONG SIDE OF MEZZANINE WALL FOR DRYER EQUIPMENT. REFER TO M102 FOR CONTINUATION.
(9) REBALANCE EXISTING EXHAUST FAN. CONTRACTOR SHALL ADJUST SHEAVE PACKAGE OR PROVIDE NEW SHEAVE PACKAGE TO ACHIEVE SCHEDULED AIRFLOWS. TEST FAN TO ENSURE PROPER PERFORMANCE ONCE ADJUSTMENTS ARE MADE.
(10) 2" CHS/CHR AND 1-1/4" HS/HR PIPING DOWN TO GROUND FLOOR. REFER TO M202 FOR CONTINUATION.
(11) EXTEND PIPING TO EQUIPMENT AND PROVIDE COIL CONNECTION AS PER DETAIL.
(12) PROVIDE ROOF CURB FOR NEW AIR HANDLING UNIT: 360-AH-6. COORDINATE WITH ARCHITECTURAL PLANS.
(13) 1" CONDENSATE PIPING. PROVIDE INDIRECT DISCHARGE PIPING TO CLOSEST STORM ROOF DRAIN.



(4) WEST ROOF PLAN - DEMOLITION AND NEW WORK

SCALE: 1/8"= 1'-0"

1/8" = 1' - 0" (0, 4, 8, 16, 24 FT)

1/16" = 1' - 0" (0, 8, 16, 32, 48 FT)

FULLY SPRINKLERED

Additions:	Date
Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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Stamp/Seal

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 40828, Expiration Date: 6/15/2017

Approved:

Approved: Chief, Facilities and Engineering

Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: MECHANICAL ROOF PLAN - DEMOLITION AND NEW WORK

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360

Checked: EPH

Drawn: MJF

Location: PERRY POINT, MD

Date: 03/17/16

VA Project Number: 512-530

Drawing Number: M103

DEPARTMENT OF VETERANS AFFAIRS

DRAWING NOTES: (APPLICABLE TO THIS DRAWING ONLY)
1. EXISTING SHOWN WITH LIGHT WEIGHT LINE,
2. NEW WORK SHOWN WITH HEAVY WEIGHT LINE,

SPECIAL NOTES: (APPLICABLE TO THIS DRAWING ONLY)

(1) PIPING LOCATED BELOW GRADE. REFER TO MECHANICAL SITE PLAN ON DRAWING M002 FOR CONTINUATION.

(2) EXTEND PIPING TO BACKFEED EXISTING PIPING SERVING PURCHASING OFFICE TERMINAL UNITS.

(3) NOT USED.

(4) REFER TO MEZZANINE LEVEL PLAN ON DRAWING M201 FOR CONTINUATION.

(5) EXTEND PIPING TO BACKFEED EXISTING PIPING SERVING 360 AH-2.

(6) EXTEND PIPING FOR SERVICE TO 360 AH-6 AND NEW TERMINAL UNITS SERVING PRINTING AREA. REFER TO GROUND FLOOR PART PLAN NORTH ON DRAWING M202 FOR CONTINUATION.

(7) PACKAGED DUAL STEAM CONVERTORS, DUAL HEATING HOT WATER PUMPS, AIR SEPARATOR, EXPANSION TANK, SHOT FEEDER, AND BYPASS WATER FILTER. REFER TO SCHEDULES AND ATC FOR ADDITIONAL INFORMATION.

(8) INCOMING STEAM PRESSURE REDUCING STATION. REFER TO SCHEDULE AND DETAIL FOR ADDITIONAL INFORMATION.

(9) PACKAGED STEAM CONDENSATE RECEIVER AND REDUNDANT PRESSURE POWERED CONDENSATE PUMPS. REFER TO SCHEDULE FOR ADDITIONAL INFORMATION.

(10) INLINE DUAL-ARM CHILLED WATER PUMPS. MOUNT OVERHEAD FROM STRUCTURE. REFER TO SCHEDULE AND DETAIL FOR ADDITIONAL INFORMATION.

(11) PROVIDE WELDED STEEL STEP-OVER FOR PROTECTION OF FLOOR MOUNTED CONDENSATE PIPING. STEP-OVER SHALL BE SUFFICIENT FOR TRAFFICKING MECHANICAL EQUIPMENT OVER TOP AT EXIT DOOR.

(12) PROVIDE EXPANSION TANK IN CHILLED WATER SUPPLY PIPING. REFER TO DETAIL AND SCHEDULE FOR ADDITIONAL INFORMATION.

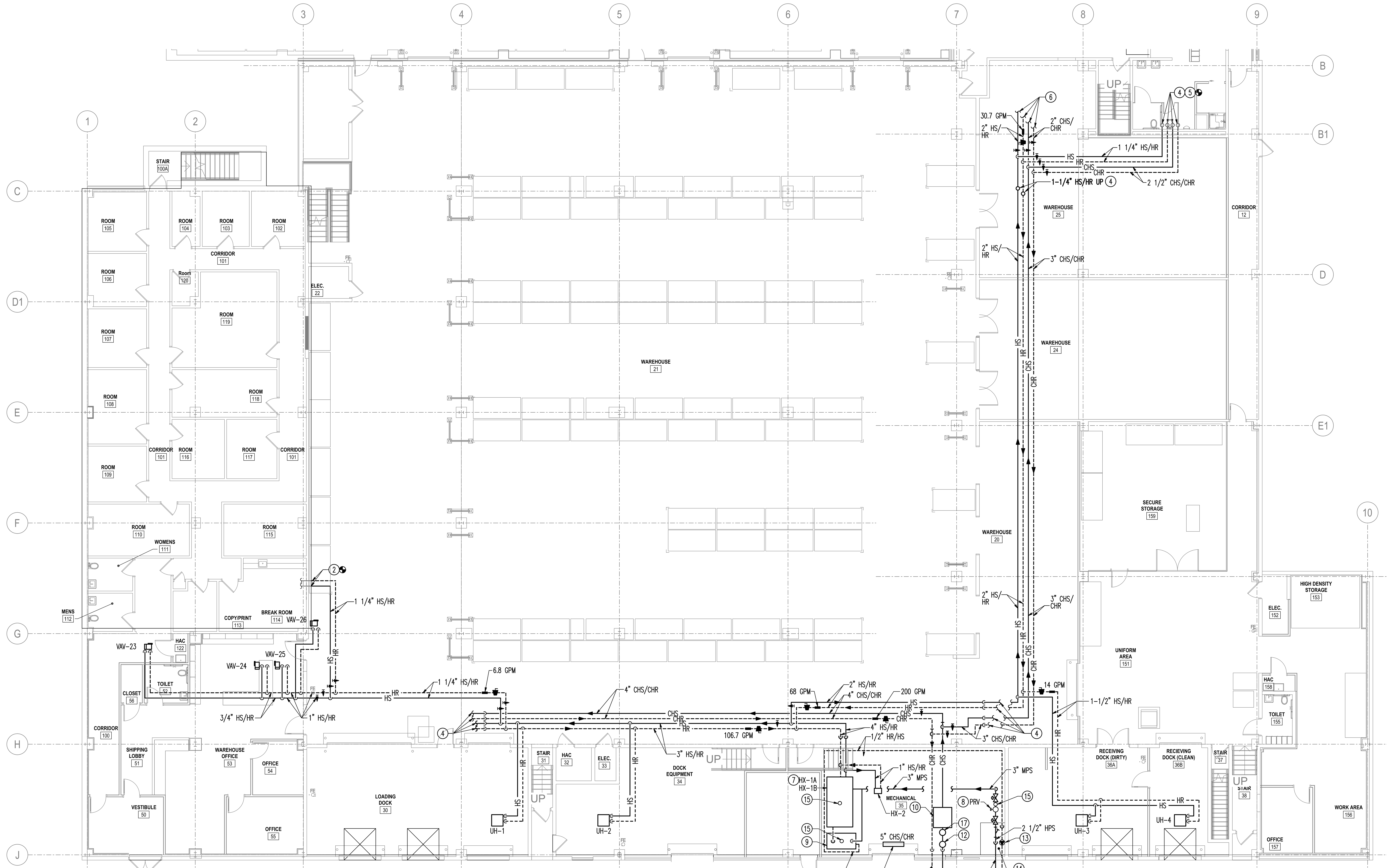
(13) PROVIDE CHECK VALVE IN PUMPED CONDENSATE RETURN PIPING IN ADDITION TO THOSE PROVIDED AT THE CONDENSATE PUMP.

(14) EXISTING PIPING ACCESS PIT.

(15) PROVIDE STEAM VAPOR VENT UP THROUGH ROOF. SIZE AS PER MANUFACTURERS RECOMMENDATIONS AND PROVIDE GOOSENECK AND INSECT SCREEN AT TERMINATION.

(16) NOT USED.

(17) PROVIDE AIR SEPARATOR IN CHILLED WATER SUPPLY PIPING. REFER TO SCHEDULE AND DETAIL FOR ADDITIONAL INFORMATION.



GROUND FLOOR PART PLAN SOUTH - MECHANICAL NEW WORK- PIPING
SCALE: 1/8" = 1'-0"

1/8" = 1' - 0"   0 4 8 16 24 FT

FULLY SPRINKLERED

Additions:	Date

Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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License No. 40828, Expiration Date: 6/15/2017

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Approved: Chief, Facilities and Engineering

Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: GROUND FLOOR PLAN - MEHCANICAL NEW WORK - PIPING

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale	Building Number	Checked	Drawn
	360	EPH	MJF

Location: PERRY POINT, MD

Date: 03/17/16

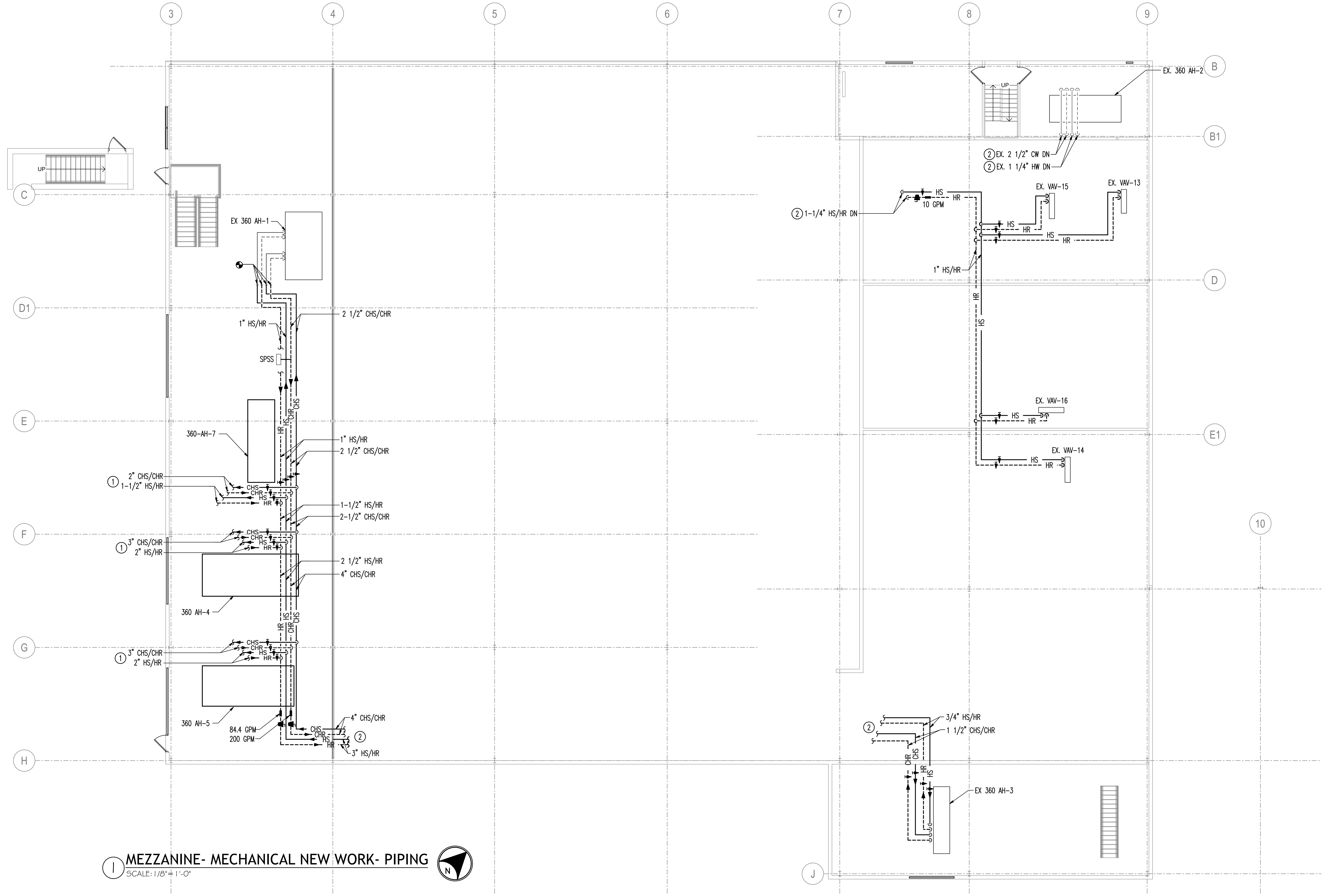
VA Project Number: 512-530

Drawing Number: M200

DEPARTMENT OF VETERANS AFFAIRS

DRAWING NOTES: (APPLICABLE TO THIS DRAWING ONLY)
1. EXISTING SHOWN WITH LIGHT WEIGHT LINE,
2. NEW WORK SHOWN WITH HEAVY WEIGHT LINE,

SPECIAL NOTES: (APPLICABLE TO THIS DRAWING ONLY)
(1) EXTEND PIPING TO EQUIPMENT AND PROVIDE COIL CONNECTION AS PER DETAIL.
(2) REFER TO GROUND FLOOR PART PLAN SOUTH ON M200 FOR CONTINUATION.



(1) MEZZANINE- MECHANICAL NEW WORK- PIPING
SCALE: 1/8"= 1'-0"

1/8" = 1' - 0" (0 4 8 16 24 FT)

FULLY SPRINKLERED

Additions:	Date

Revisions:	Date
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Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: MEZZANINE PART PLAN - MECHANICAL NEW WORK - PIPING

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale	Building Number	Checked	Drawn
	360	EPH	MJF

Location: PERRY POINT, MD

Date: 03/17/16

VA Project Number: 512-530

Drawing Number: M201

DEPARTMENT OF VETERANS AFFAIRS

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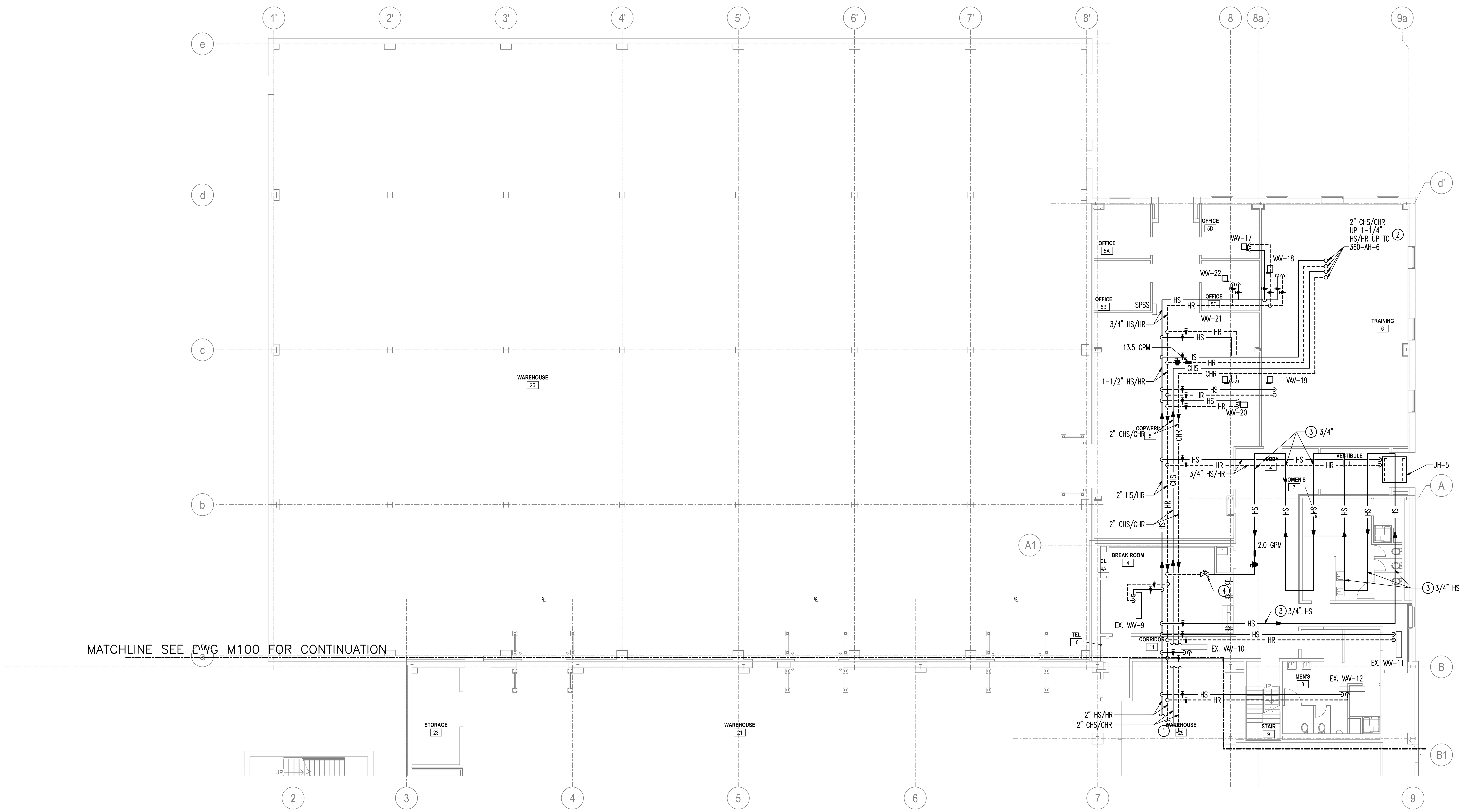
1. EXISTING SHOWN WITH LIGHT WEIGHT LINE,
2. NEW WORK SHOWN WITH HEAVY WEIGHT LINE,

SPECIAL NOTES: (APPLICABLE TO THIS DRAWING ONLY)
(1) REFER TO GROUND FLOOR PART PLAN SOUTH ON DRAWING M200 FOR CONTINUATION.
(2) REFER TO MECHANICAL ROOF PLANS ON DRAWING M103 FOR CONTINUATION. PHP-6 SERVING 360-AH-6 SHALL BE LOCATED IN CEILING PLENUM SPACE.
(3) PROVIDE UNINSULATED PIPING LOOP FOR HEATING OF PLENUM SPACE. LOCATE PIPING LOOP AS CLOSE TO CEILING AS PRACTICAL.
(4) REFER TO ATC FOR ADDITIONAL INFORMATION ON VALVE OPERATION. BALANCE TO 2 GPM FLOW RATE.



GROUND FLOOR PART PLAN NORTH - MECHANICAL NEW WORK - PIPING
SCALE: 1/8"= 1'-0"

1/8" = 1' - 0" 0 4 8 16 24 FT

FULLY SPRINKLERED

Additions:	Date
Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
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Stamp/Seal
STATE OF MARYLAND PROFESSIONAL ENGINEER
3/17/2016
Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 40808, Expiration Date: 6/15/2017

Approved:

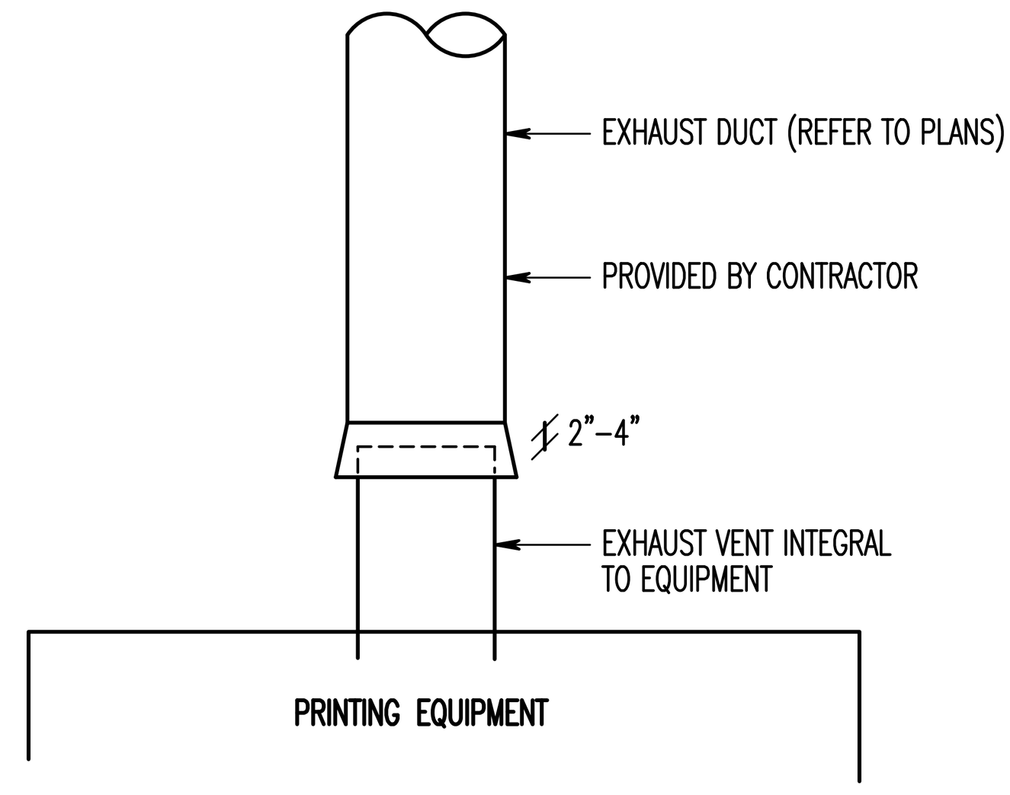
Approved: Chief, Facilities and Engineering
Approved: Associate Chief for Maintenance And Operations, Perry Point
Approved: Engineering Projects Supervisor
Approved: Infection Control Officer

Drawing Title: GROUND FLOOR PART PLAN - MECHANICAL NEW WORK - PIPING
Approved: Associate Director for Operations
Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION
Scale:
Building Number: 360
Checked: EPH
Drawn: MJF
Location: PERRY POINT, MD

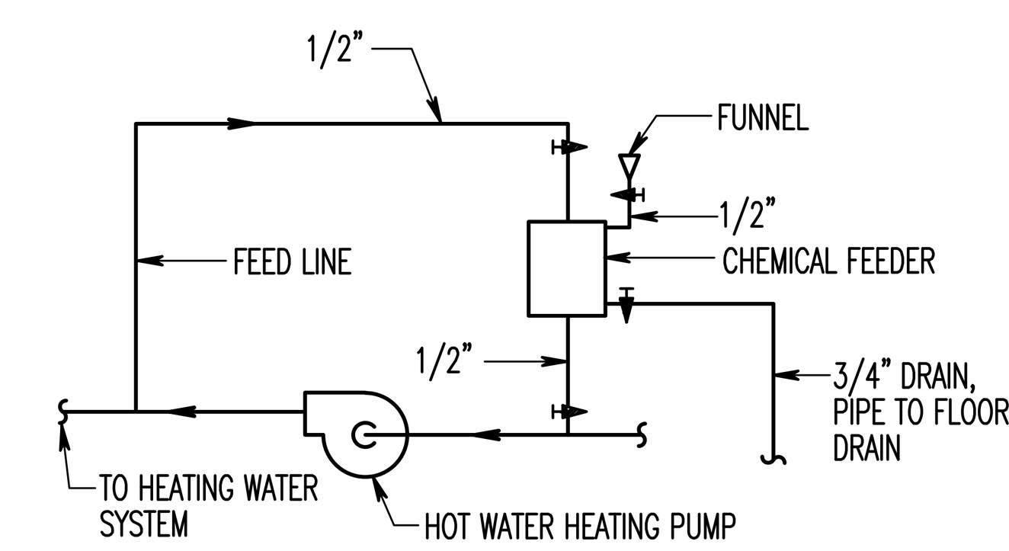
Date: 03/17/16
VA Project Number: 512-530
Drawing Number: M202

DEPARTMENT OF VETERANS AFFAIRS



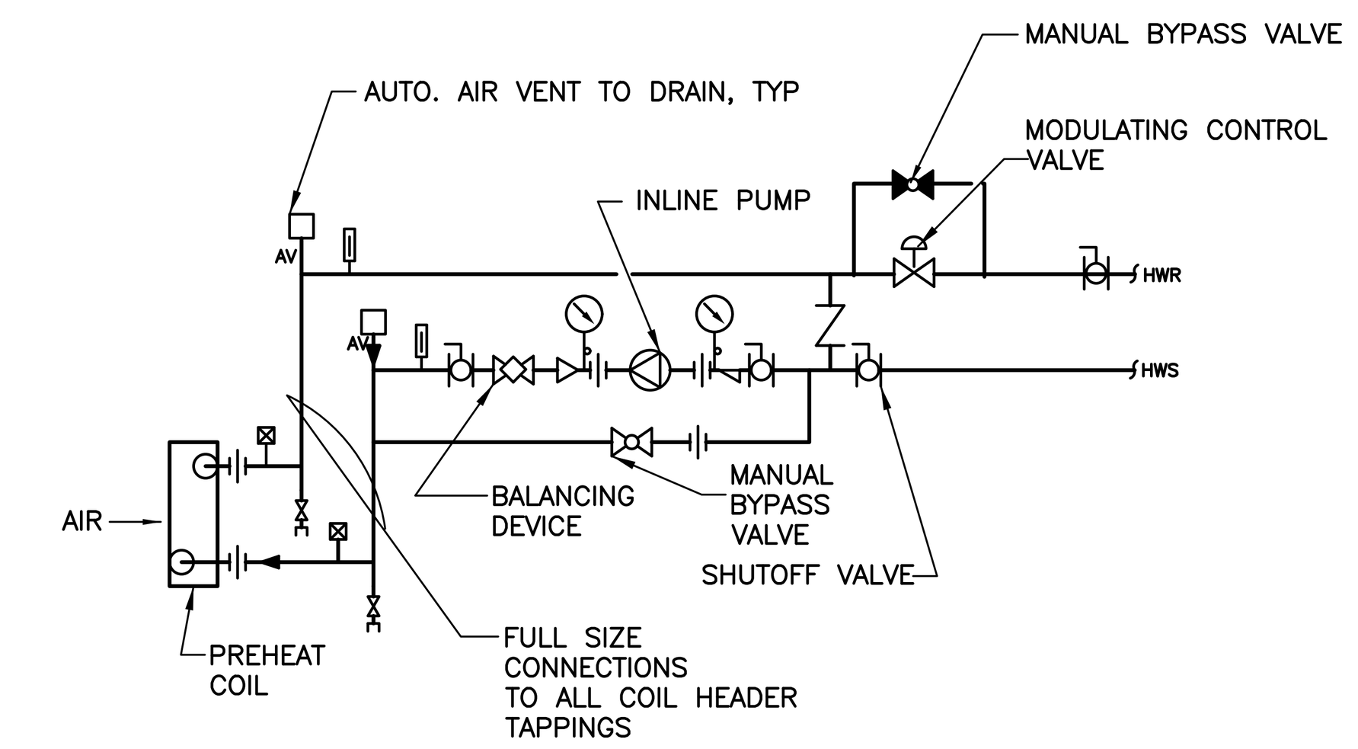
1 M500 THIMBLE EXHAUST CONNECTION DETAIL

NO SCALE



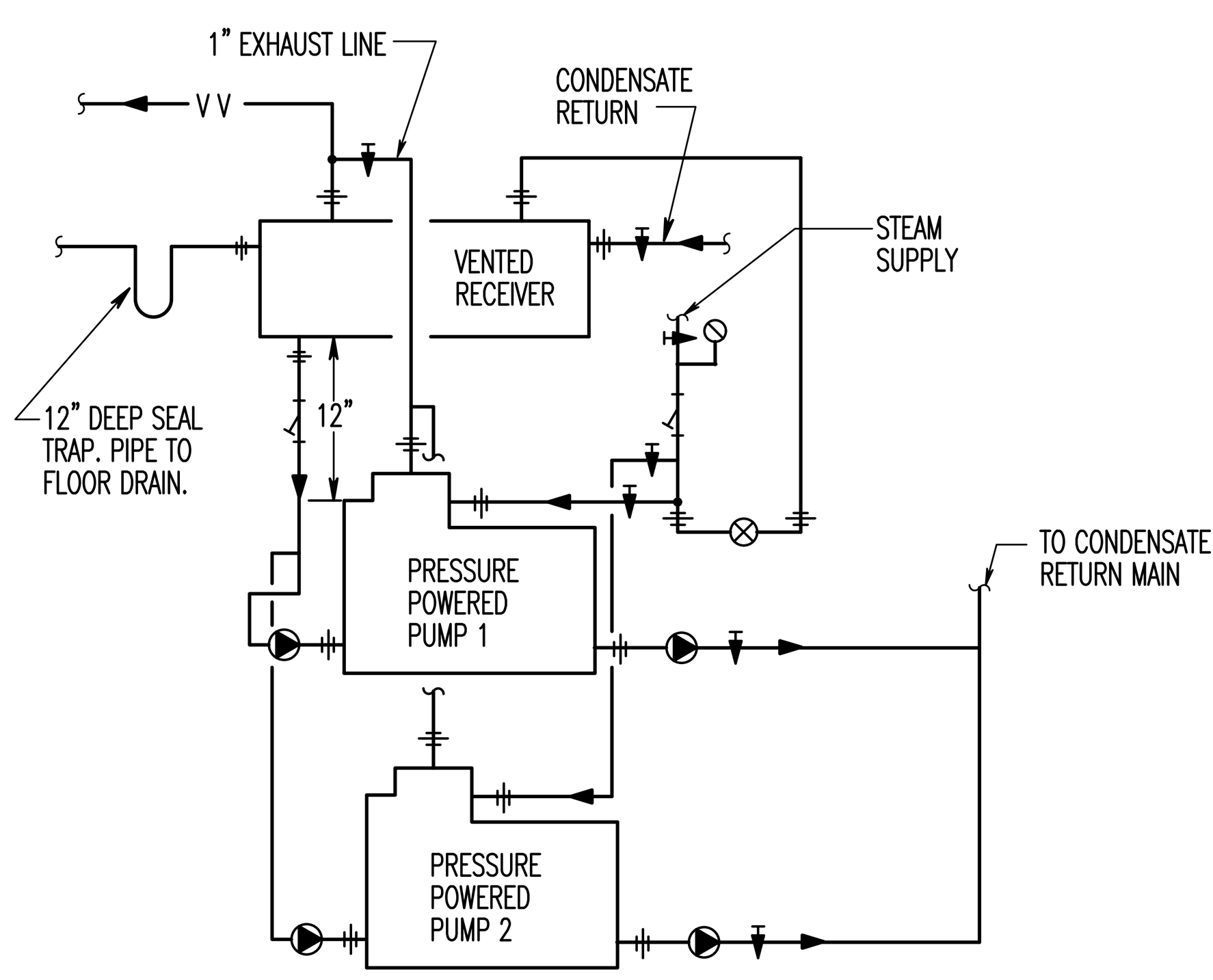
2 M500 HOT WATER CHEMICAL FEED SYSTEM

NO SCALE



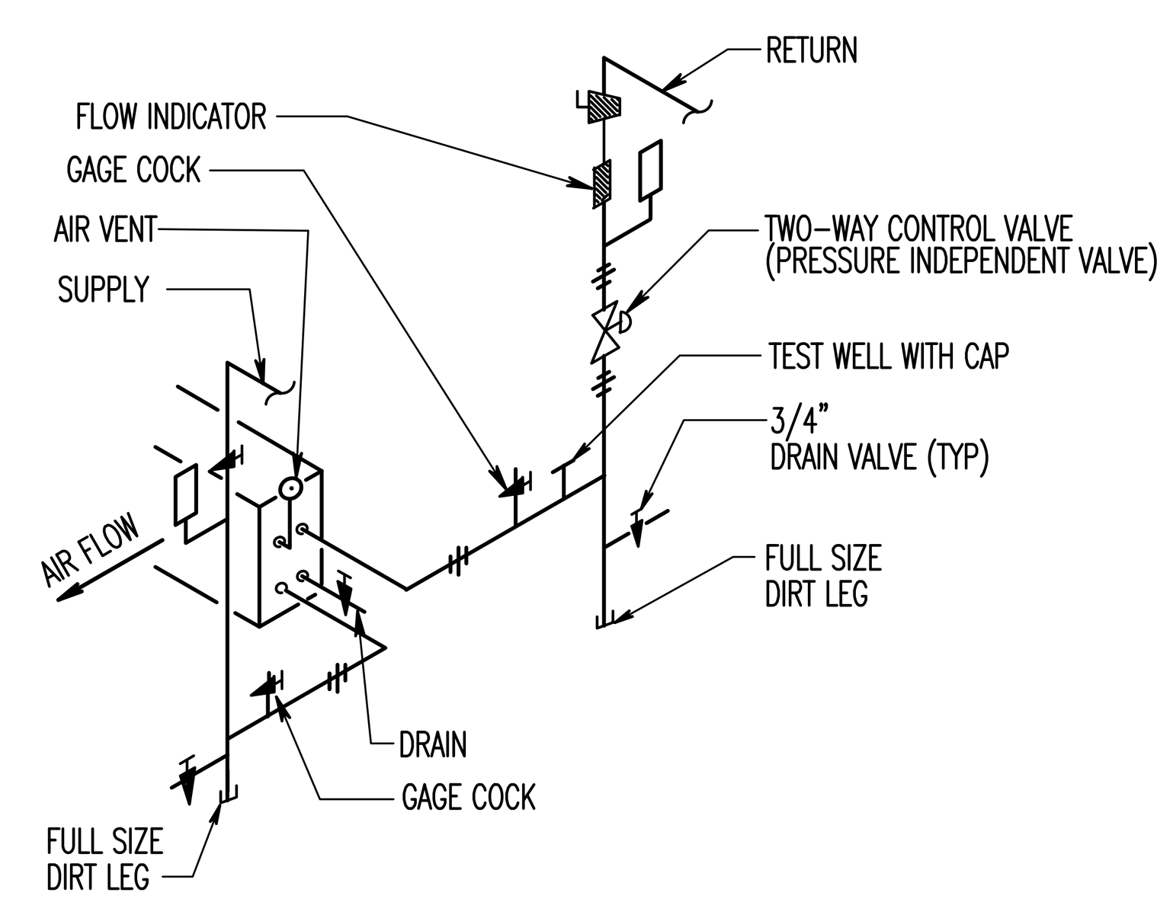
3 M500 PREHEAT COIL (HOT WATER) – PIPING CONNECTIONS

NO SCALE



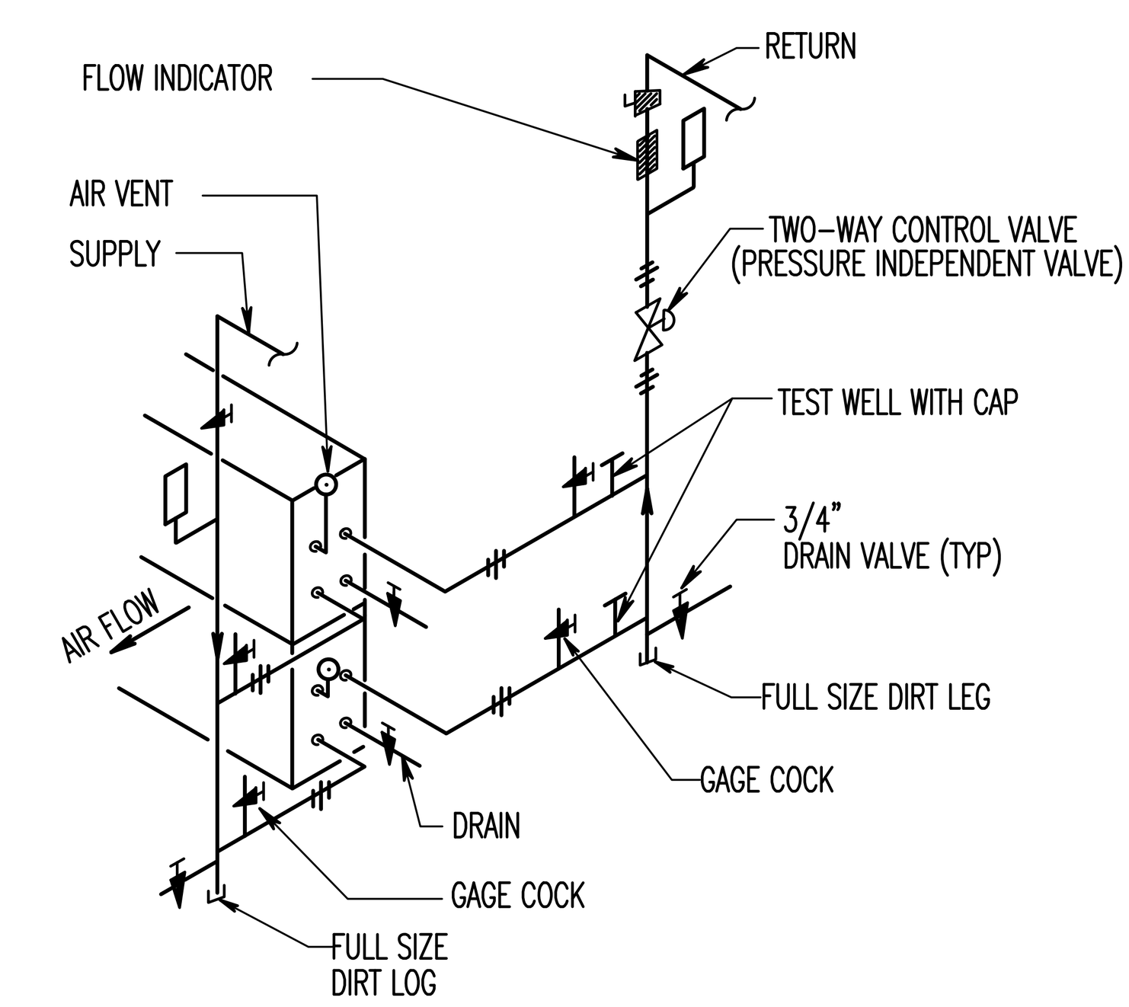
4 M500 PRESSURE POWERED CONDENSATE PUMP

NO SCALE



5 M500 SINGLE WATER COIL PIPING

NO SCALE



6 M500 MULTIPLE WATER COIL PIPING

NO SCALE

Additions:	Date
Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
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STATE OF MARYLAND · PROFESSIONAL ENGINEER

3/17/2016

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 40828, Expiration Date: 6/15/2017

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Approved: Infection Control Officer

Approved: Associate Director for Operations

Approved: Director, Medical Center

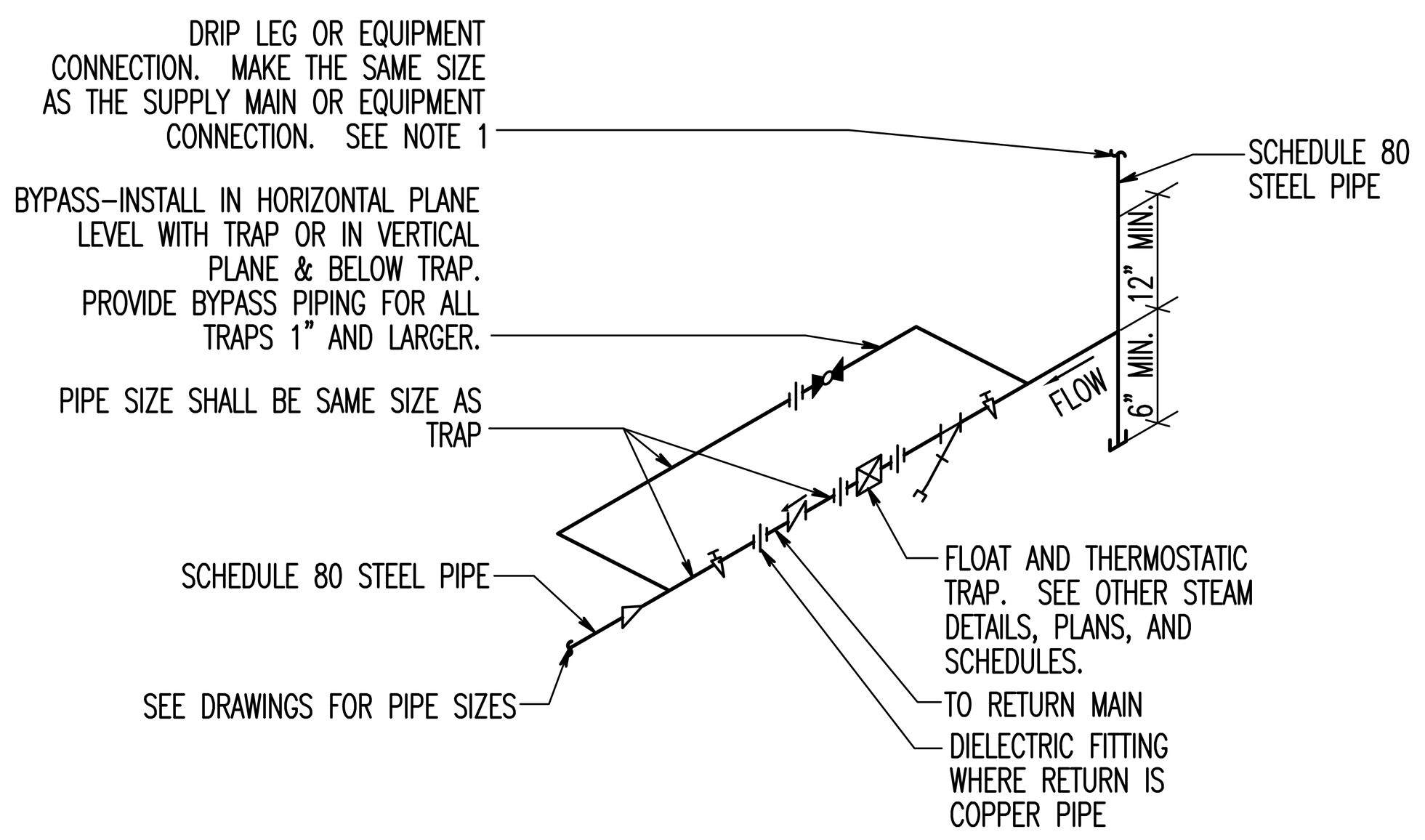
FULLY SPRINKLERED

Drawing Title	Project Title	Date
MECHANICAL DETAILS	WAREHOUSE RENOVATION & EXPANSION	03/17/16
		VA Project Number: 512-530

Scale	Building Number	Checked	Drawn	Drawing Number
	360	EPH	MJF	M500

Location: PERRY POINT, MD

DEPARTMENT OF VETERANS AFFAIRS

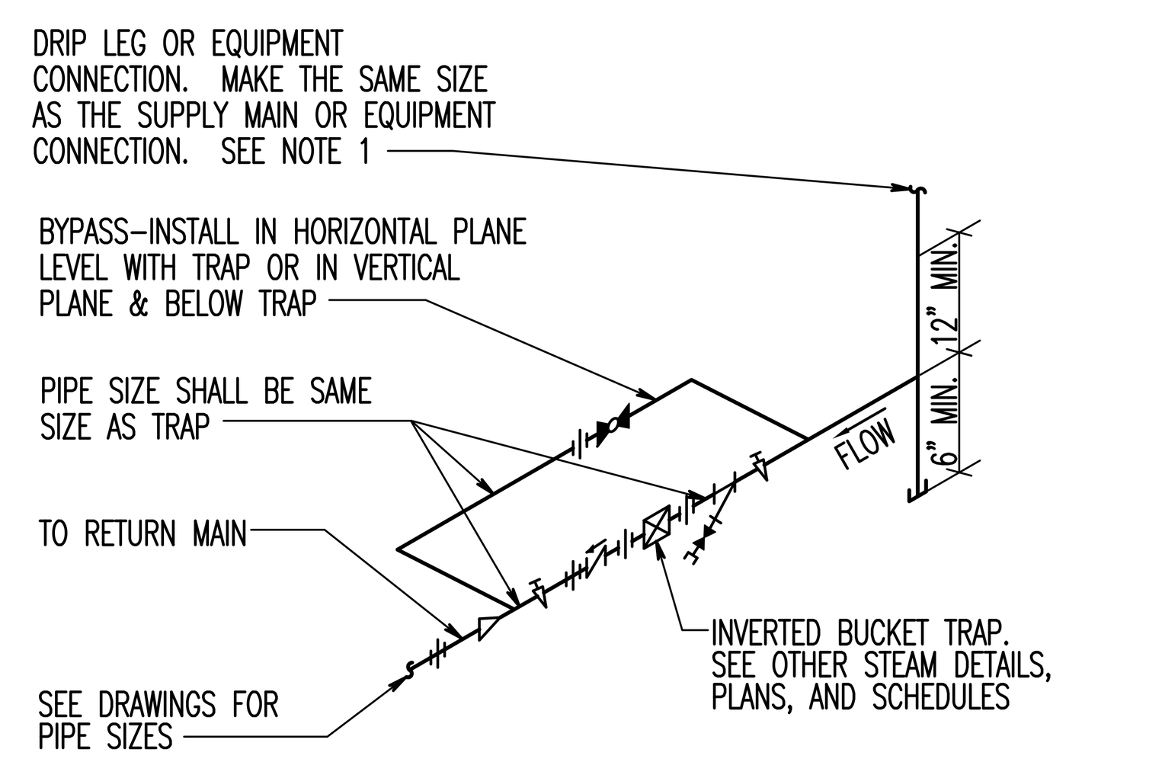


NOTES:

1. ALL DRIP POINTS ON STEAM MAINS SHALL BE PROVIDED WITH A 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE MINIMUM 6" SCALE POCKET BELOW TRAP INLET.

1 FLOAT & THERMOSTATIC STEAM TRAP

M501 — NO SCALE

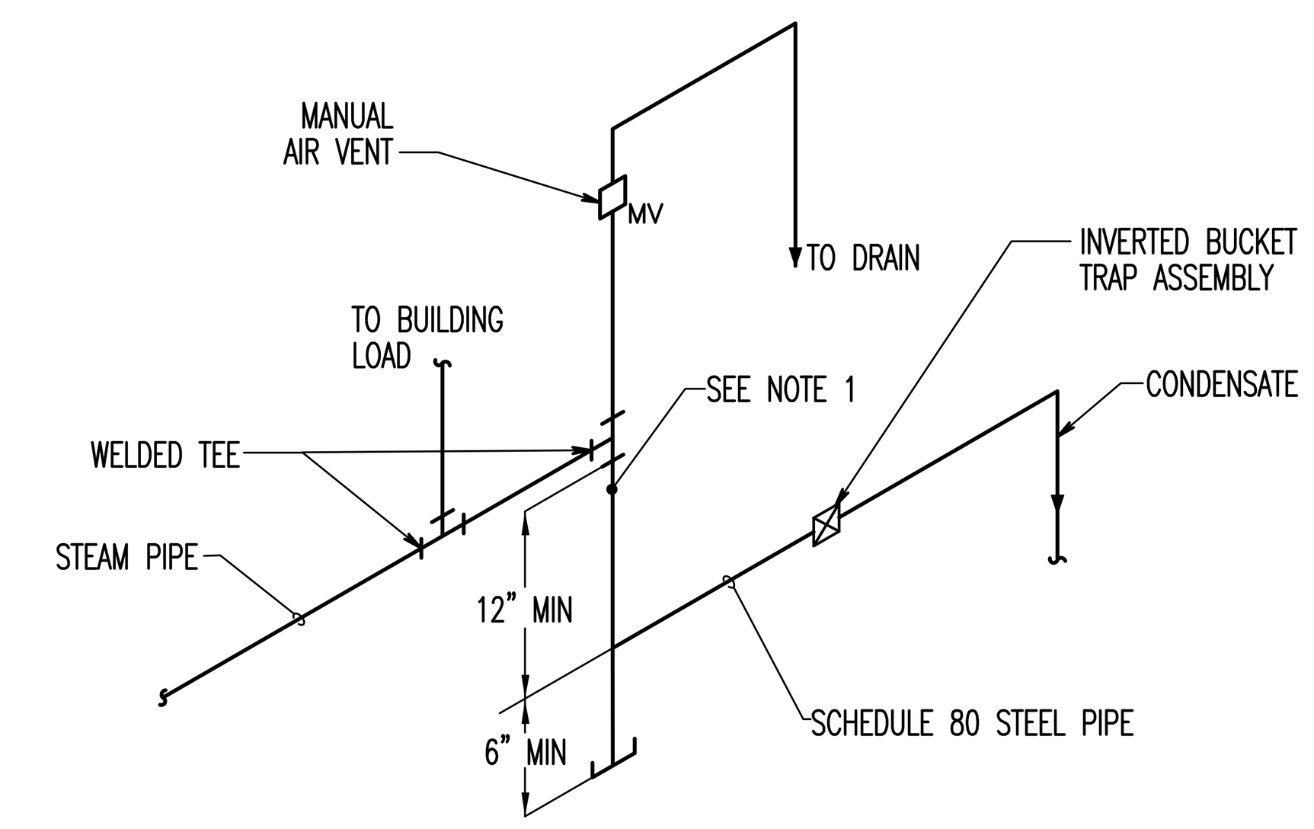


NOTES:

1. ALL DRIP POINTS ON STEAM MAINS SHALL BE PROVIDED WITH A 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE MINIMUM 6" SCALE POCKET BELOW TRAP INLET.

2 INVERTED BUCKET STEAM TRAP

M501 — NO SCALE

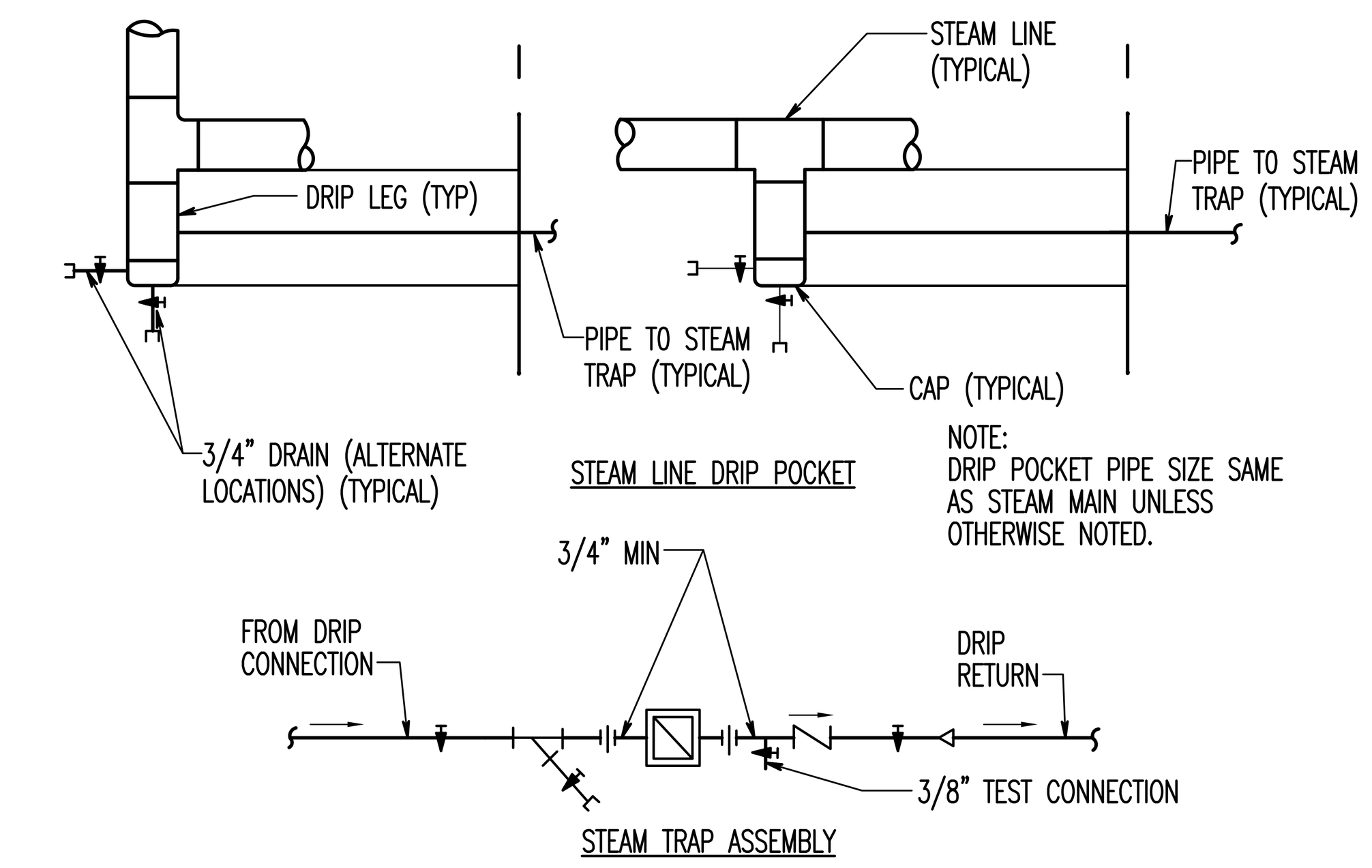


NOTES:

1. PROVIDE 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE MINIMUM 6" SCALE POCKET BELOW TRAP INLET.

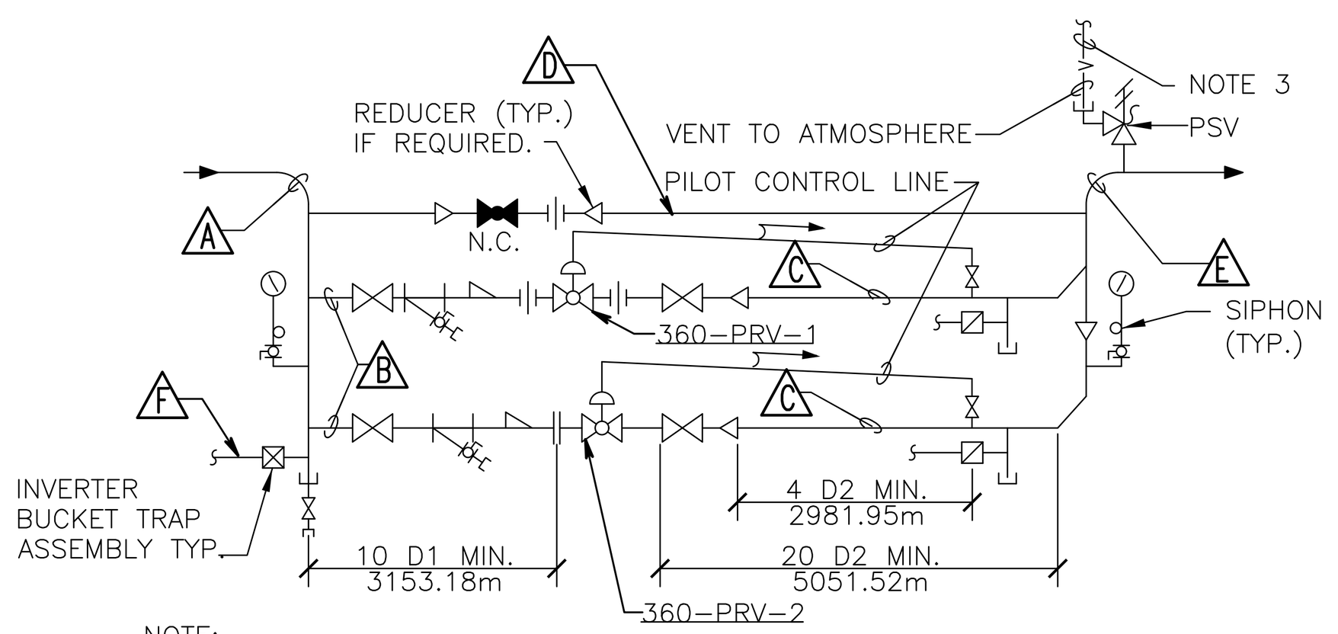
3 END OF STEAM LINE DRIP TRAP

M501 — NO SCALE



4 STEAM LINE DRIP POCKET STEAM TRAP ASSEMBLY

M501 — NO SCALE

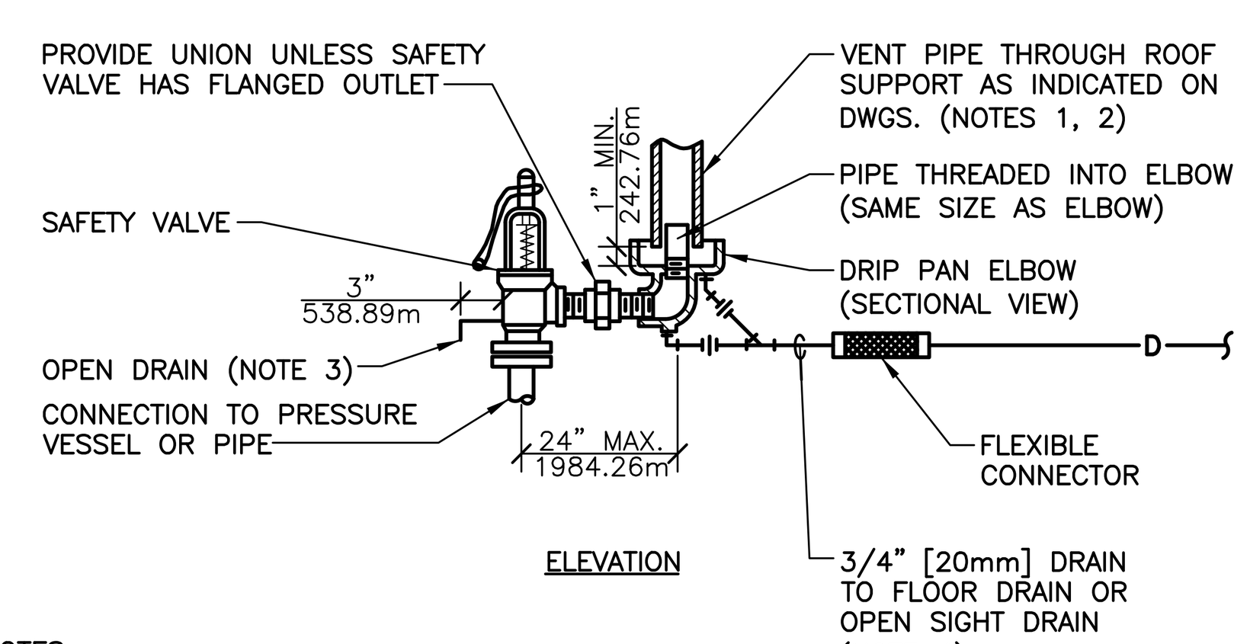


NOTE:

1. SEE FLOOR PLANS FOR PIPE SIZES.
2. SEE EQUIPMENT SCHEDULES FOR VALVE DATA AND PIPE SIZES D1 AND D2. INSTALL VALVES AS RECOMMENDED BY MANUFACTURER.
3. MAKE BYPASS VALVE DISCHARGE PIPE THE SAME SIZE AS D2 FOR THE LARGEST PRV.
4. PROVIDE NECESSARY UNIONS FOR THE REMOVAL OF VALVE WITH SCREWED CONNECTIONS.

5 STEAM PRESSURE REDUCING STATION DOUBLE VALVE (1/3 AND 2/3)

M501 — NTS

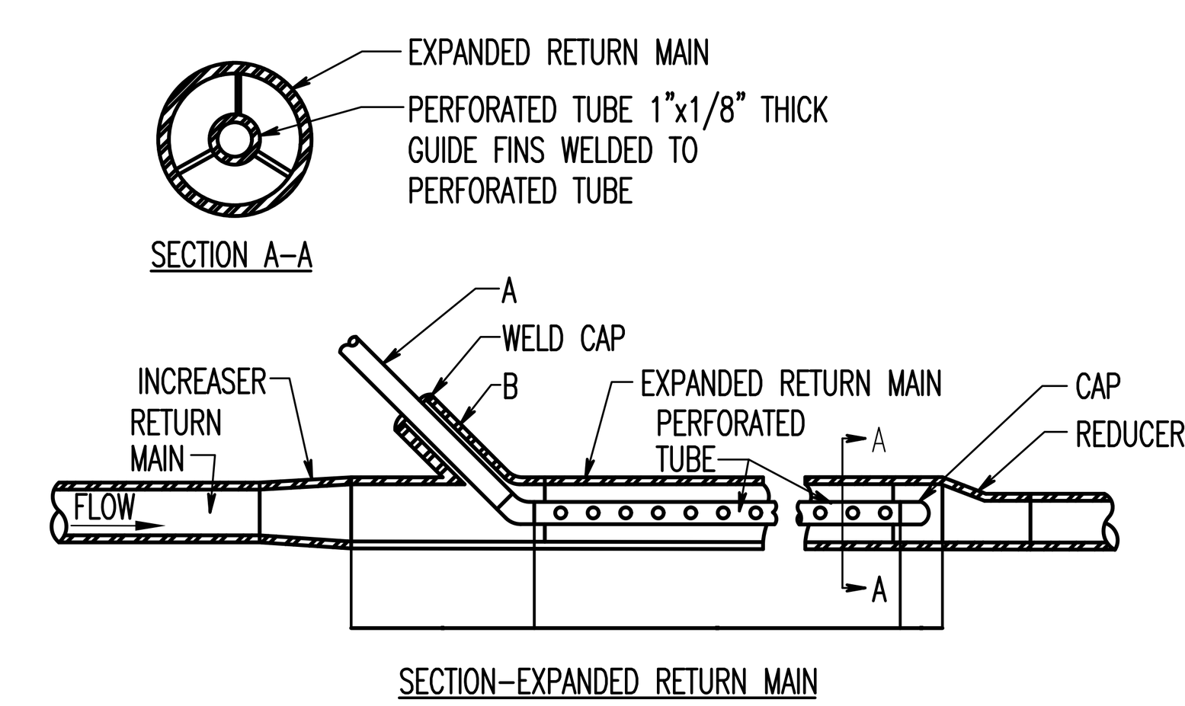


NOTES:

1. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, SIZE THE VENT PIPE SO THAT STEAM IS NOT BLOWN OUT AT THE VENT PIPE ENTRANCE. UTILIZE THE CALCULATION METHOD CONTAINED IN ANSI B31.1. POWER PIPING CODE, APPENDIX II.
2. VENT PIPE SHALL TERMINATE 6' MIN. ABOVE FINISHED ROOF.
3. DISCHARGE OF DRAIN MUST BE DIRECTED AWAY FROM PLATFORMS OR OTHER AREAS WHICH PERSONNEL MAY OCCUPY.
4. DO NOT CONNECT ANY OTHER DRAIN TO THE DRIP PAN ELBOW DRAIN PIPE.

6 STEAM SAFETY VALVE

M501 — NTS



SECTION–EXPANDED RETURN MAIN

A	SIZE, TRAP DISCHARGE LINE	1/2"	3/4"
B	SIZE, 45° WELDING NIPPLE	1"	1-1/4"
C	LENGTH OF EXPANDED MAIN AHEAD OF TRAP DISCHARGE PIPE	7"	7"
D	LENGTH OF PERFORATED PIPE	16-1/2"	16-1/2"
E	LENGTH OF EXPANDED MAIN OF FOLLOWING PERFORATED PIPE	2"	2"

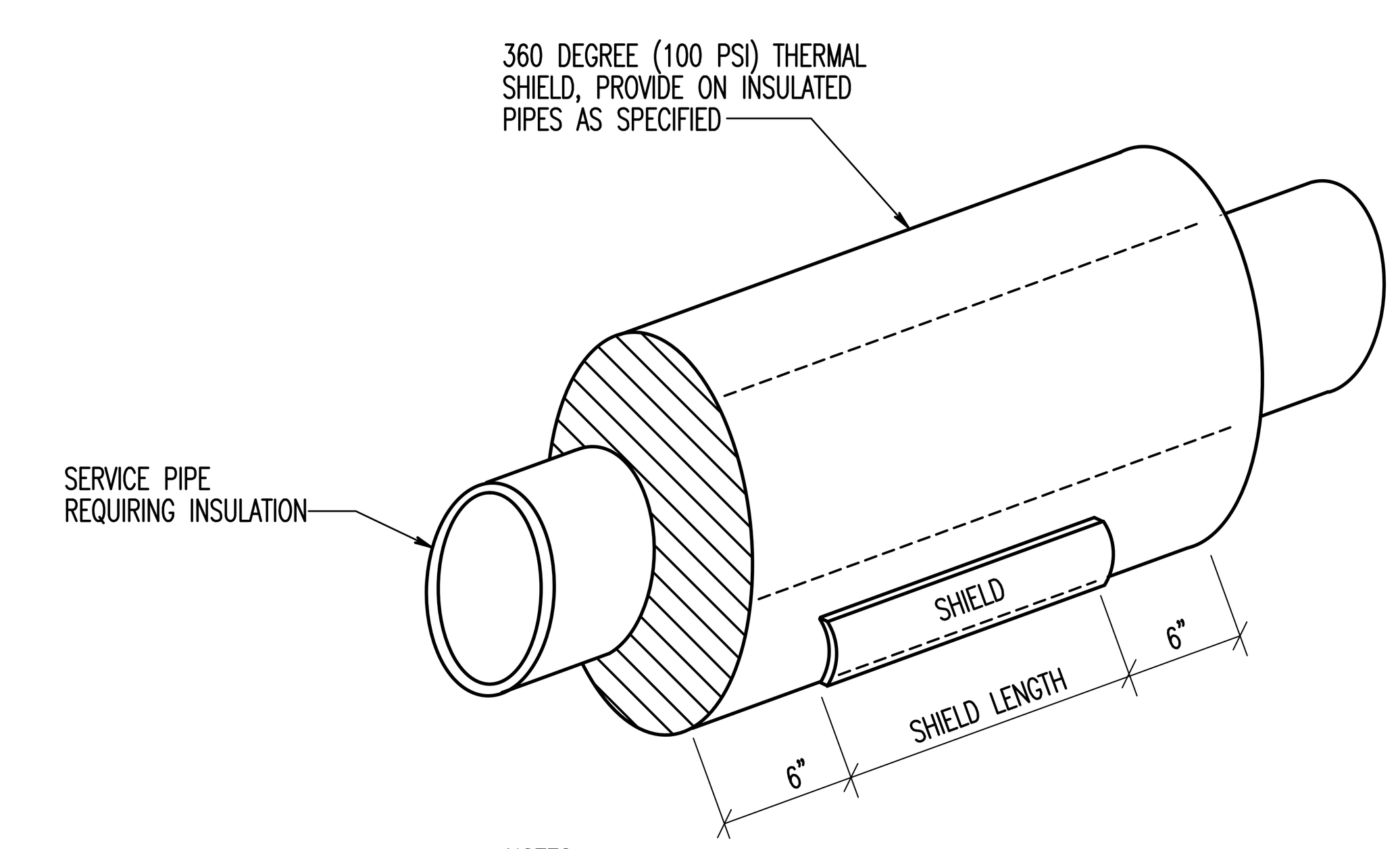
RETURN MAIN SIZE	UP TO 1-1/2"	2"	3" & OVER
EXPANDED RETURN MAIN SIZE		2-1/2"	SAME SIZE

NOTES:

1. 1/2" PERFORATED TUBE SHALL HAVE 40 – 1/8" DIAMETER HOLES SPACED 1-1/2" O.C. IN 4 ROWS.
2. 3/4" PERFORATED TUBE SHALL HAVE 78 – 1/8" DIAMETER HOLES SPACED 1-1/2" O.C. IN 6 ROWS.
3. HOLES IN TUBE SHALL BE SPACED EQUALLY AROUND PERIMETER.

7 HPR & MPR STEAM TRAP DISCHARGE INTO PUMPED CONDENSATE RETURN LINE

M501 — NO SCALE



NOTES:

1. SIMILAR FOR PIPING USING ROLLER SUPPORT IN LIEU OF SHIELD
2. REFER TO SPECIFICATIONS FOR SHIELD LENGTH

8 PIPE INSULATION PROTECTION DETAIL

M501 — NO SCALE

Additions:	Date
Revisions:	**Date**
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
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3/17/2016

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Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: MECHANICAL DETAILS

Approved: Associate Director for Operations

Approved: Director, Medical Center

FULLY SPRINKLERED

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360

Checked: EPH

Drawn: MJF

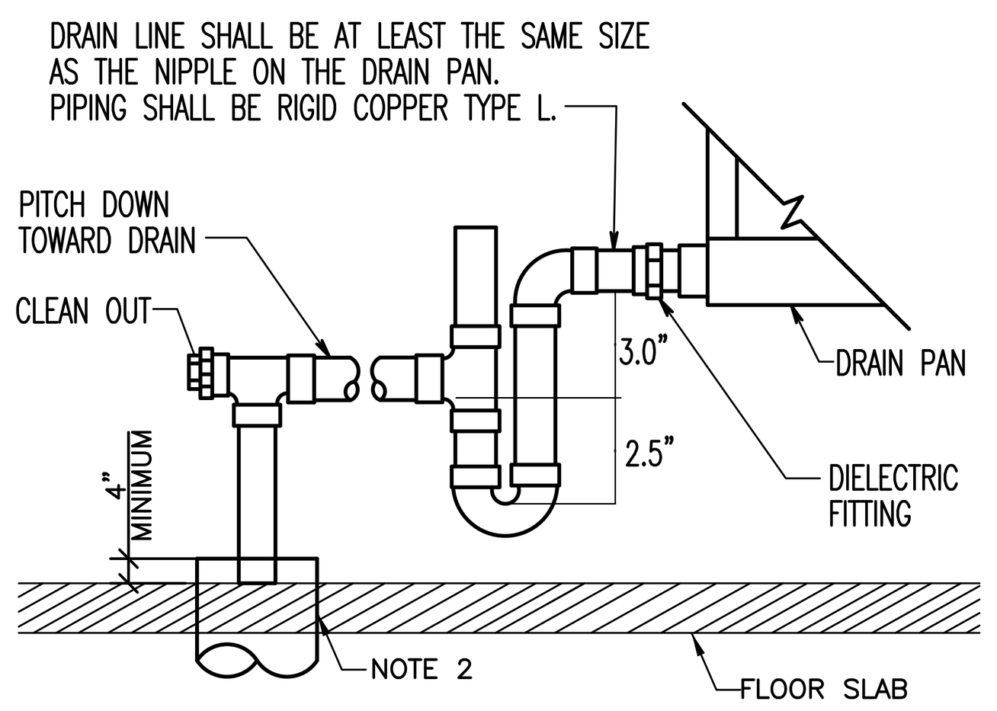
Location: PERRY POINT, MD

Date: 03/17/16

VA Project Number: 512-530

Drawing Number: M501

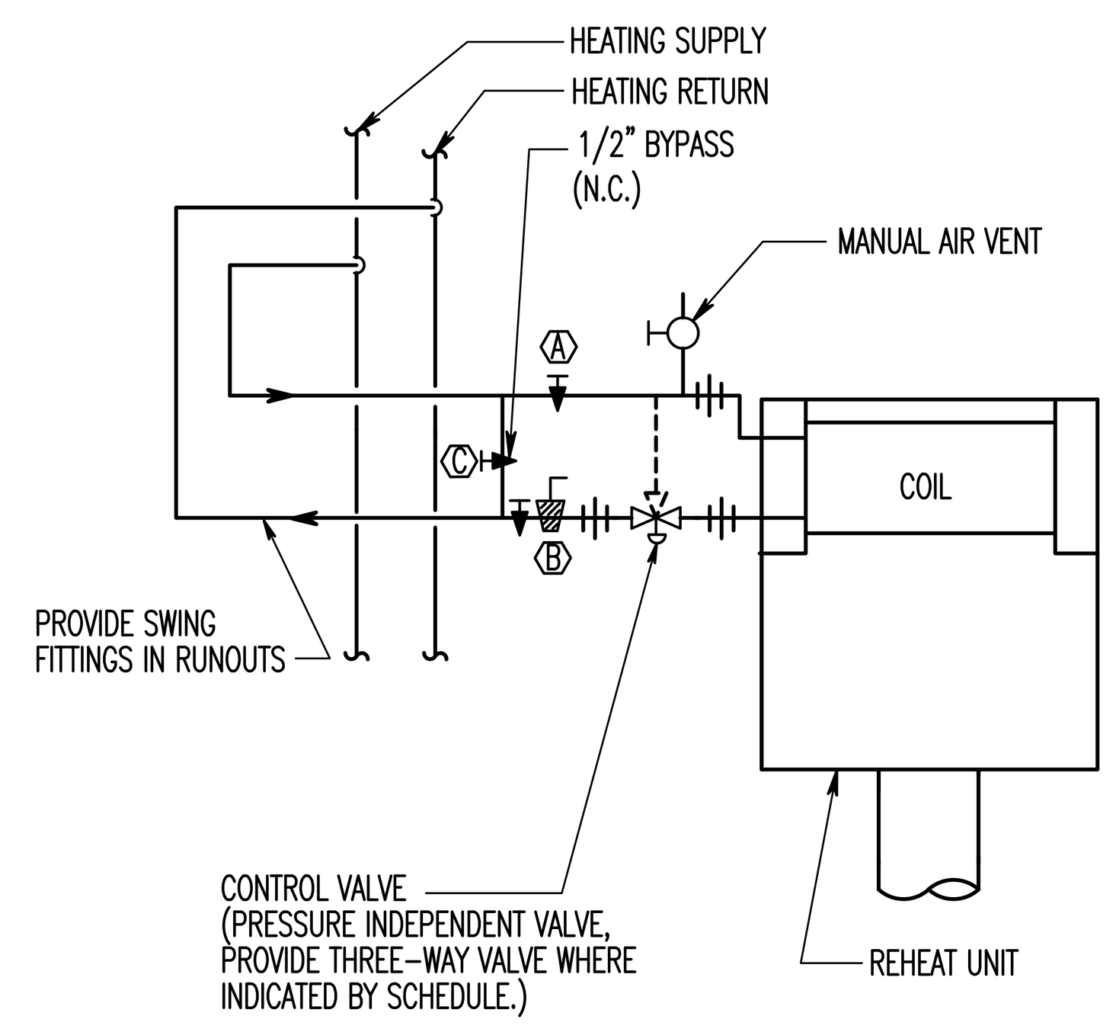
DEPARTMENT OF VETERANS AFFAIRS



NOTES:

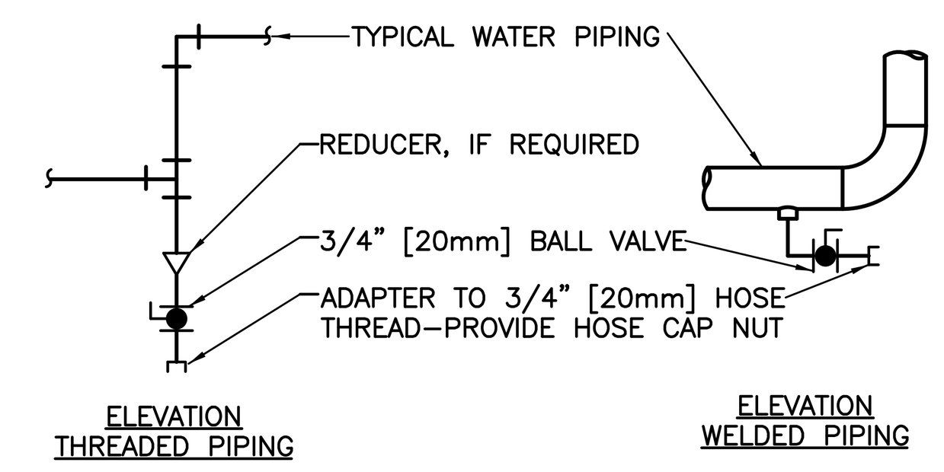
1. DIELECTRIC FITTING TO BE USED WHEN TWO DISSIMILAR METALS ARE TO BE CONNECTED.
2. PROVIDE 6" STANDPIPE FOR INDIRECT DISCHARGE OF AIR HANDLING UNIT CONDENSATE DRAIN. TRANSITION TO SMALLER SIZE PIPE AS NOTED IN PLANS IN VERTICAL.

1 AHU CONDENSATE TRAP
M502
NO SCALE



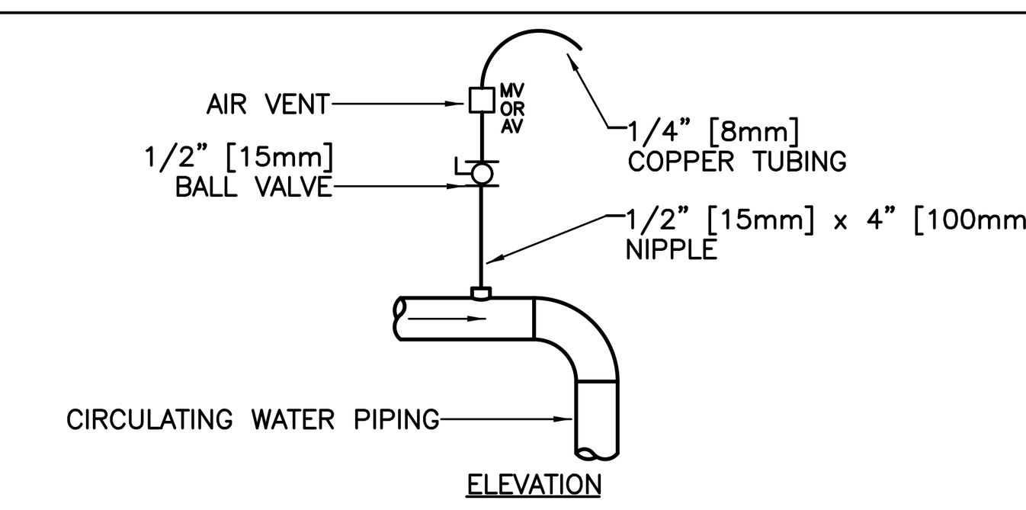
NOTES:
1. MAINTAIN VALVES (A) AND (B) TO UNIT CLOSED AND BYPASS VALVE (C) OPEN UNTIL PIPING SYSTEM HAS BEEN CLEANED AND FLUSHED AS SPECIFIED AFTER FINAL FLUSHING CLOSE BYPASS VALVE (C) AND OPEN VALVES (A) AND (B) TO UNIT.
2. INSTALL CONTROL VALVE IN VERTICAL POSITION WITH ACTUATOR ON TOP.
3. AFTER FINAL FLUSHING REMOVE VALVE (C) HANDLE.

2 REHEAT UNIT PIPING
M502
NO SCALE



TYPICAL CHILLED AND HOT WATER PIPING DRAIN VALVE CONNECTIONS

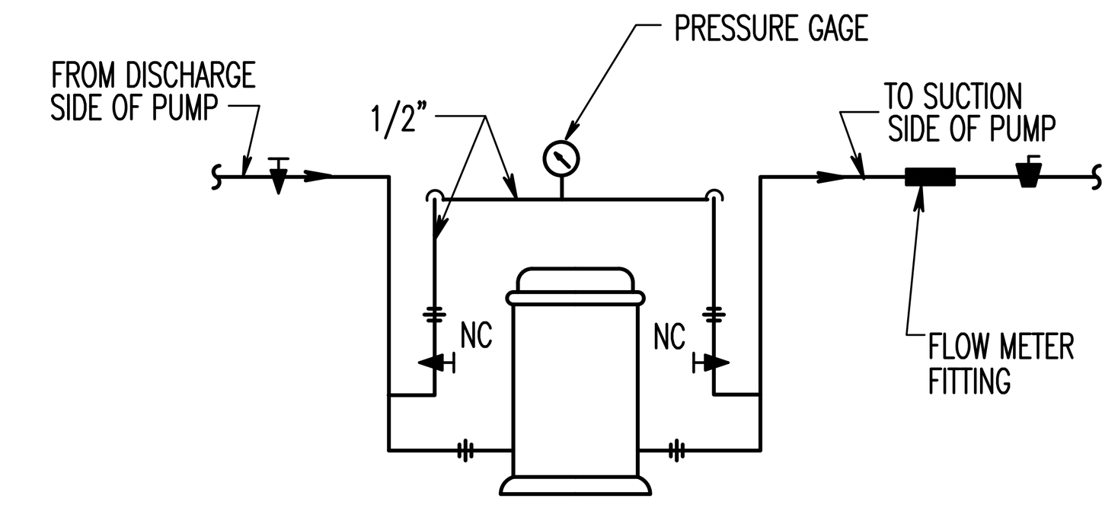
NOTES:
1. DRAIN ALL LOW POINTS AS INDICATED ABOVE.
2. WHERE SCALE POCKETS ARE SHOWN ON PIPE RISER DIAGRAMS AND/OR PLANS LOCATE DRAIN AT BOTTOM OF SCALE POCKET.



TYPICAL MANUAL AIR VENT

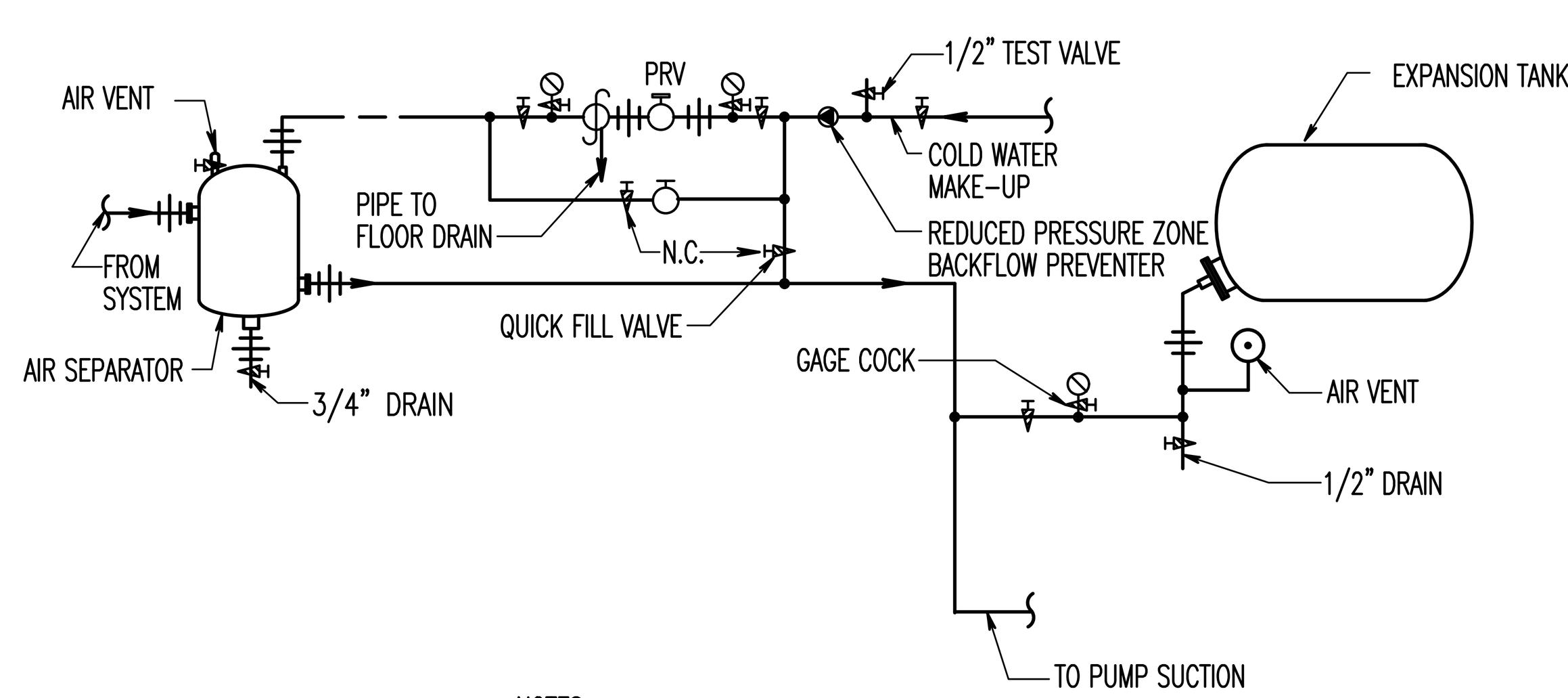
NOTES:
1. VENT ALL HIGH POINTS INDICATED ABOVE.
2. IF AUTOMATIC AIR VENTS ARE USED, PIPE DISCHARGE TO DRAIN.

3 DRAIN VALVE AND AIR VENT CONNECTIONS
M502
NTS



NOTES:
1. ALLOW ROOM ABOVE FILTER HOUSING TO ALLOW REMOVAL OF FILTER CARTRIDGES.

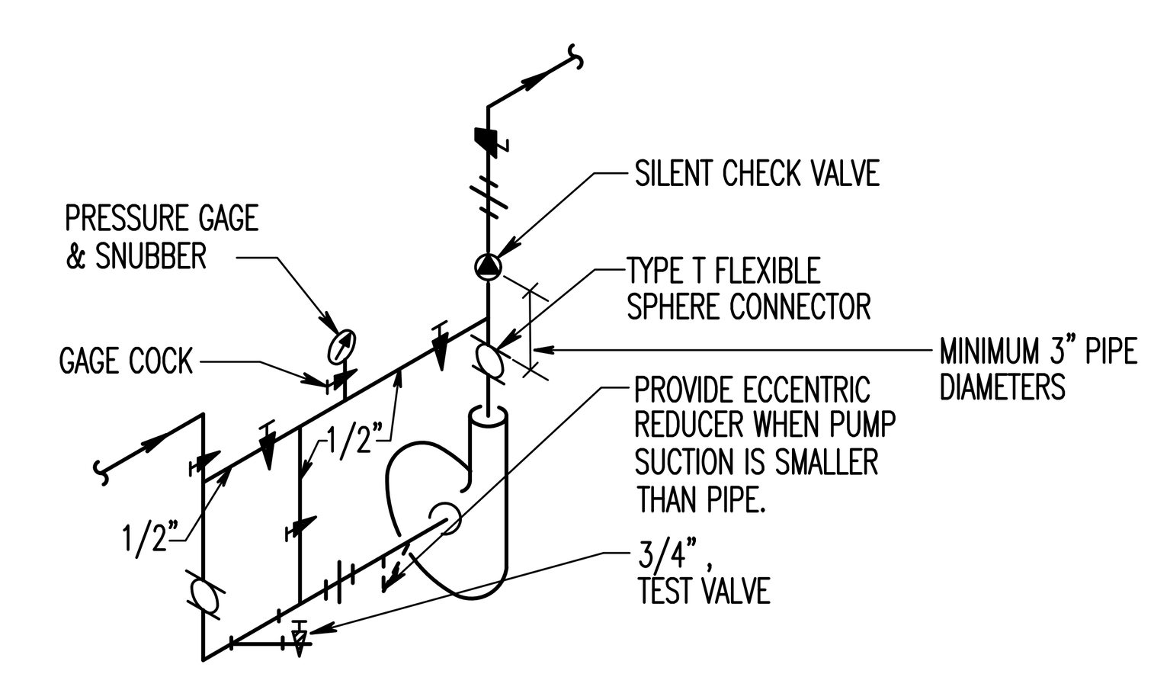
4 BYPASS WATER FILTER
M502
NO SCALE



NOTES:

1. DOES NOT APPLY TO DOMESTIC HOT WATER SYSTEMS.

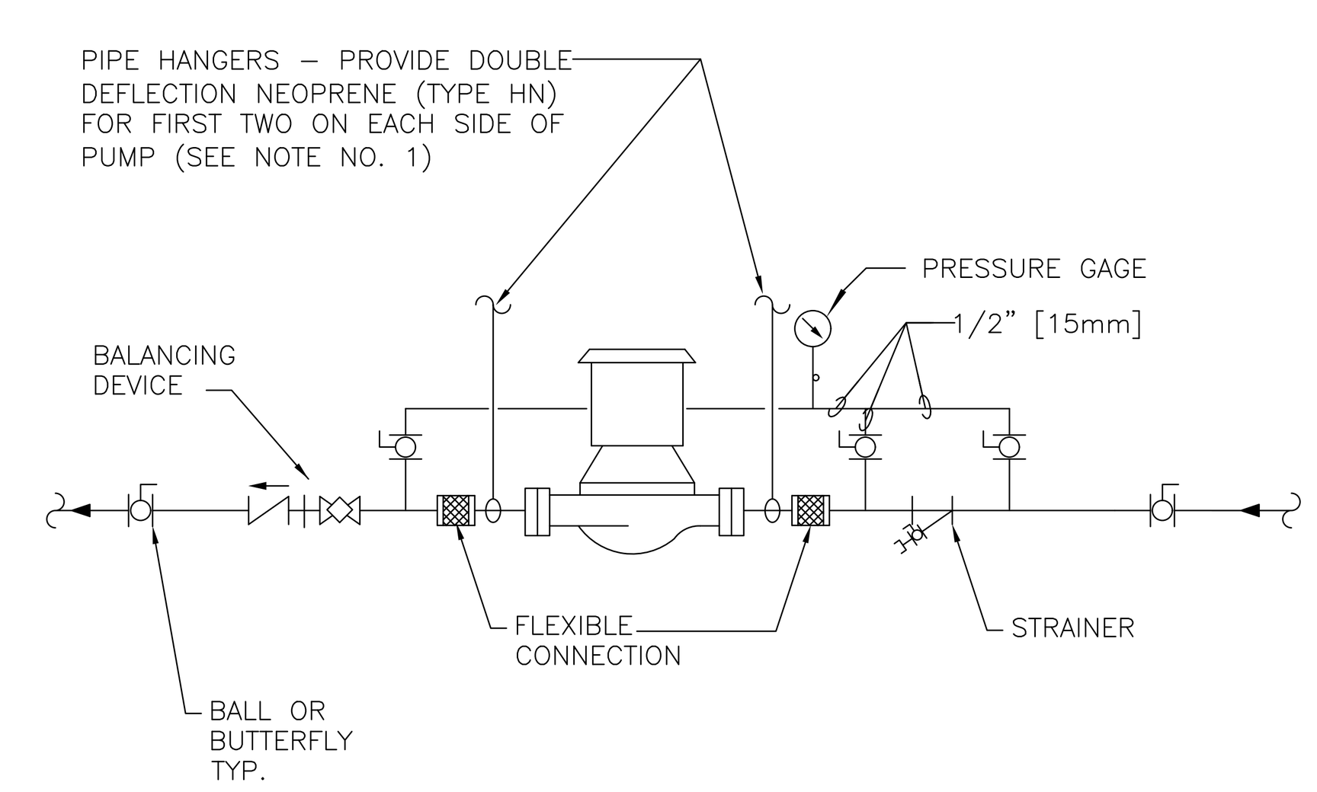
5 DIAPHRAGM EXPANSION TANK
M502
NO SCALE



NOTES:

1. PUMP IS SPECIFIED AS VERTICAL INLINE DUAL ARM PUMP.

6 PUMP PIPING
M502
NO SCALE



NOTES:

1. SUPPORT PUMP FROM PIPING ONLY. DO NOT SUPPORT PUMP FROM MOTOR.

7 IN-LINE PUMPS - CONNECTIONS
M502
NO SCALE

FULLY SPRINKLERED

Additions:	Date

Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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Approved:

Approved: Chief, Facilities and Engineering

Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: MECHANICAL DETAILS

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale	Building Number	Checked	Drawn
	360	EPH	MJF

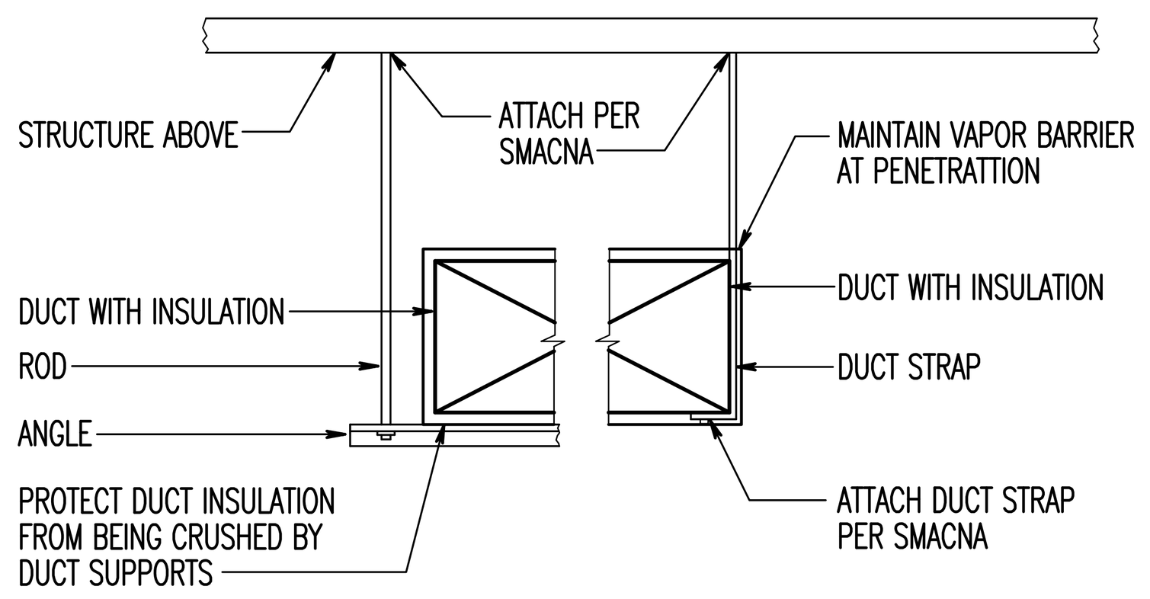
Location: PERRY POINT, MD

Date: 03/17/16

VA Project Number: 512-530

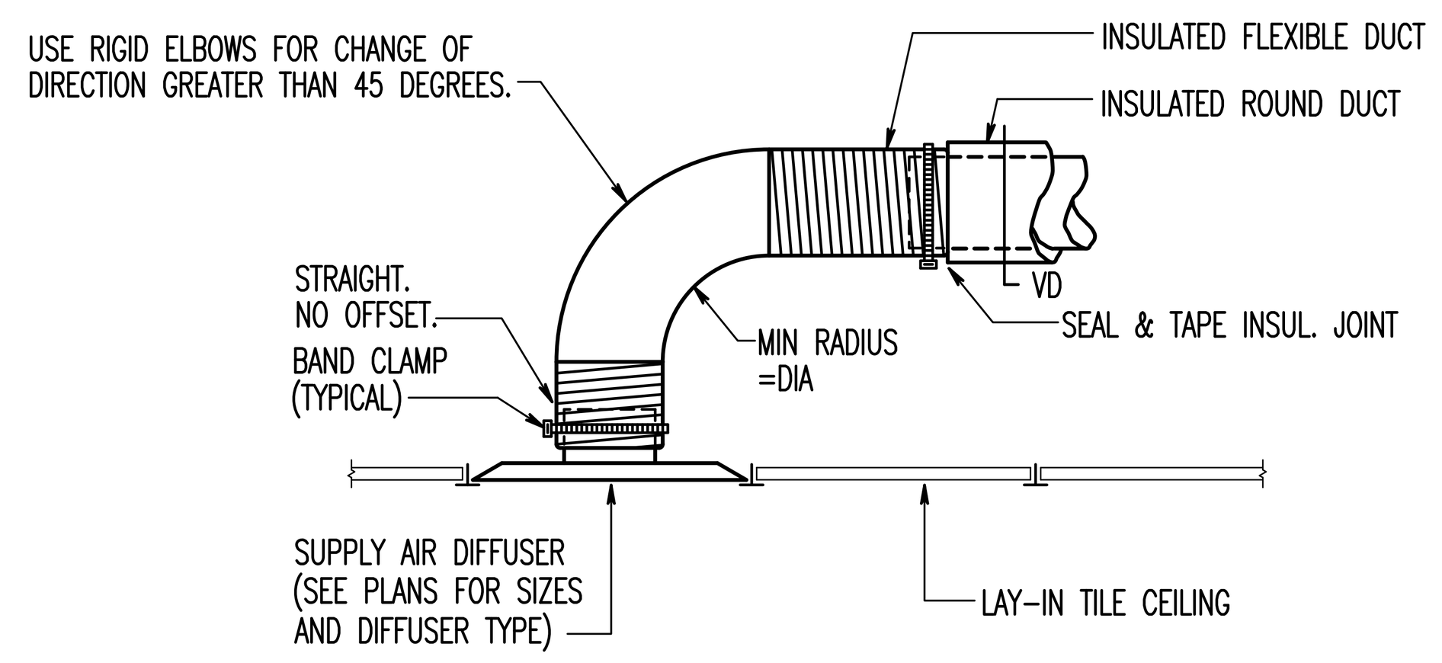
Drawing Number: M502

DEPARTMENT OF VETERANS AFFAIRS

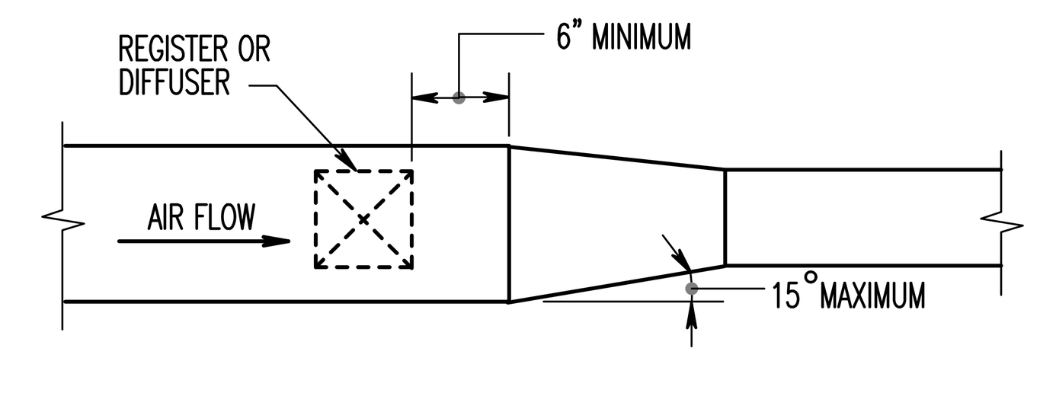


NOTES:
1. REFER TO SMACNA FOR ADDITIONAL HANGERS AND SUPPORTS.

1 DUCT INSULATION SUPPORT DETAIL
M503 NO SCALE

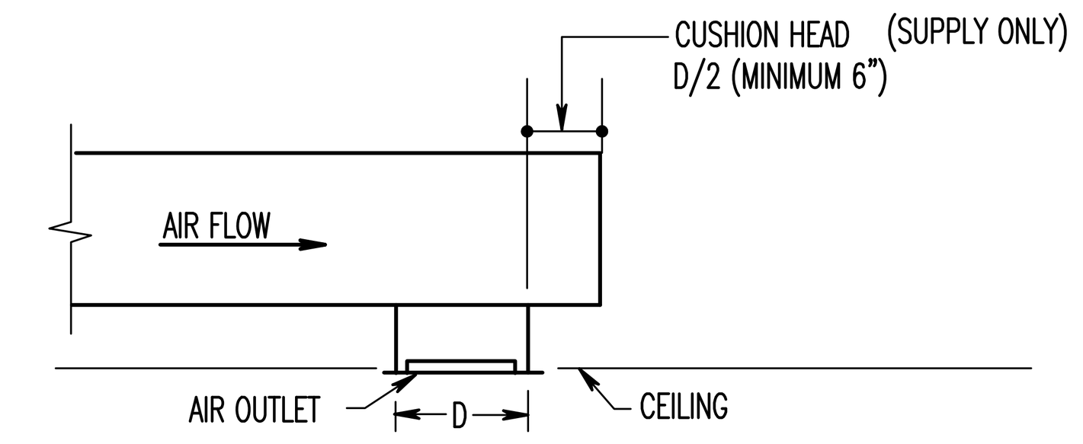


2 SUPPLY AIR DIFFUSER FLEXIBLE DUCT CONNECTION
M503 NO SCALE



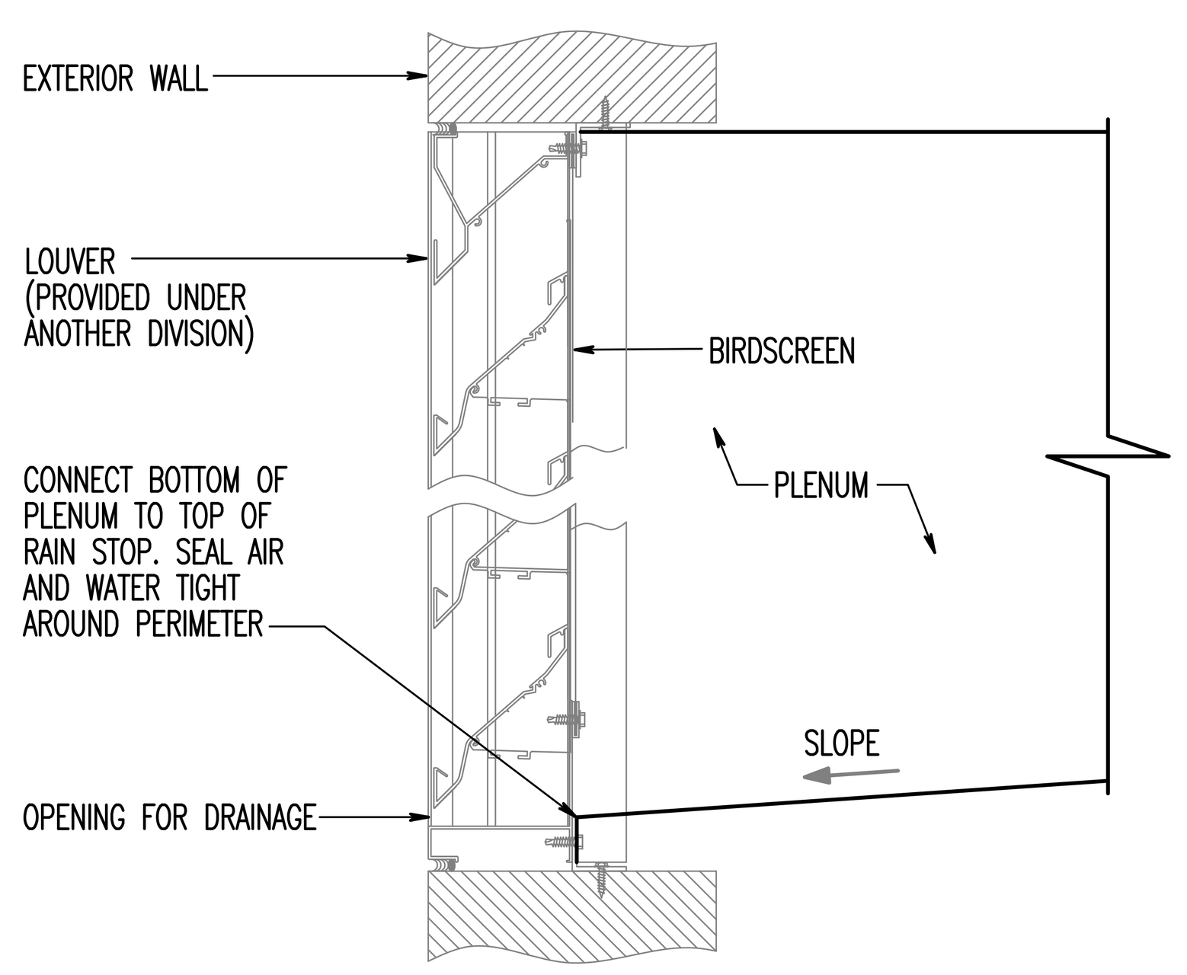
NOTES:
1. SAME FOR RETURN AND EXHAUST DUCTS EXCEPT AIR FLOW IS REVERSED.

3 DIFFUSER OR REGISTER TAPOFF AND TRANSITION
M503 NO SCALE



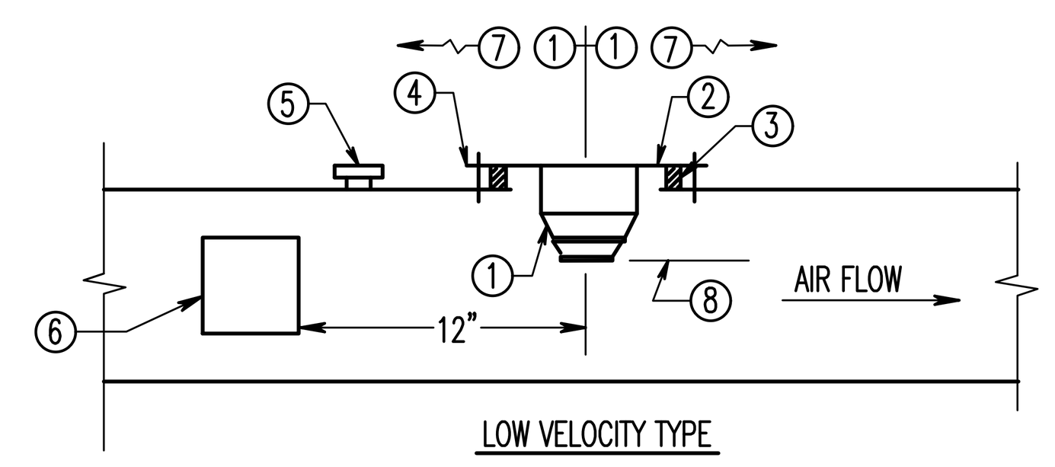
NOTES:
1. AIR FLOW IS REVERSE FOR RETURN AND EXHAUST.

4 OUTLET LOCATED AT END OF RUN
M503 NO SCALE



NOTES:
1. CONNECT PLENUM TO LOUVER IN ACCORDANCE WITH MANUFACTURER REQUIREMENTS.

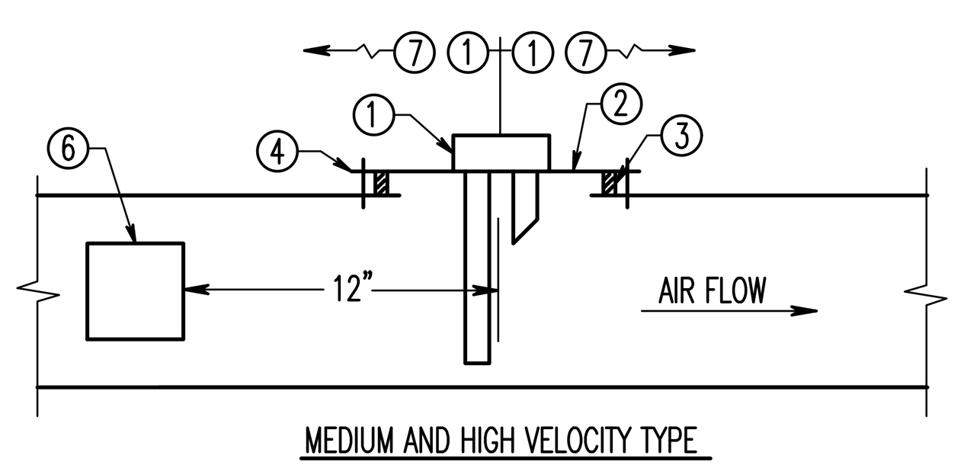
5 PLENUM CONNECTION TO LOUVER
M503 NO SCALE



LOW VELOCITY TYPE

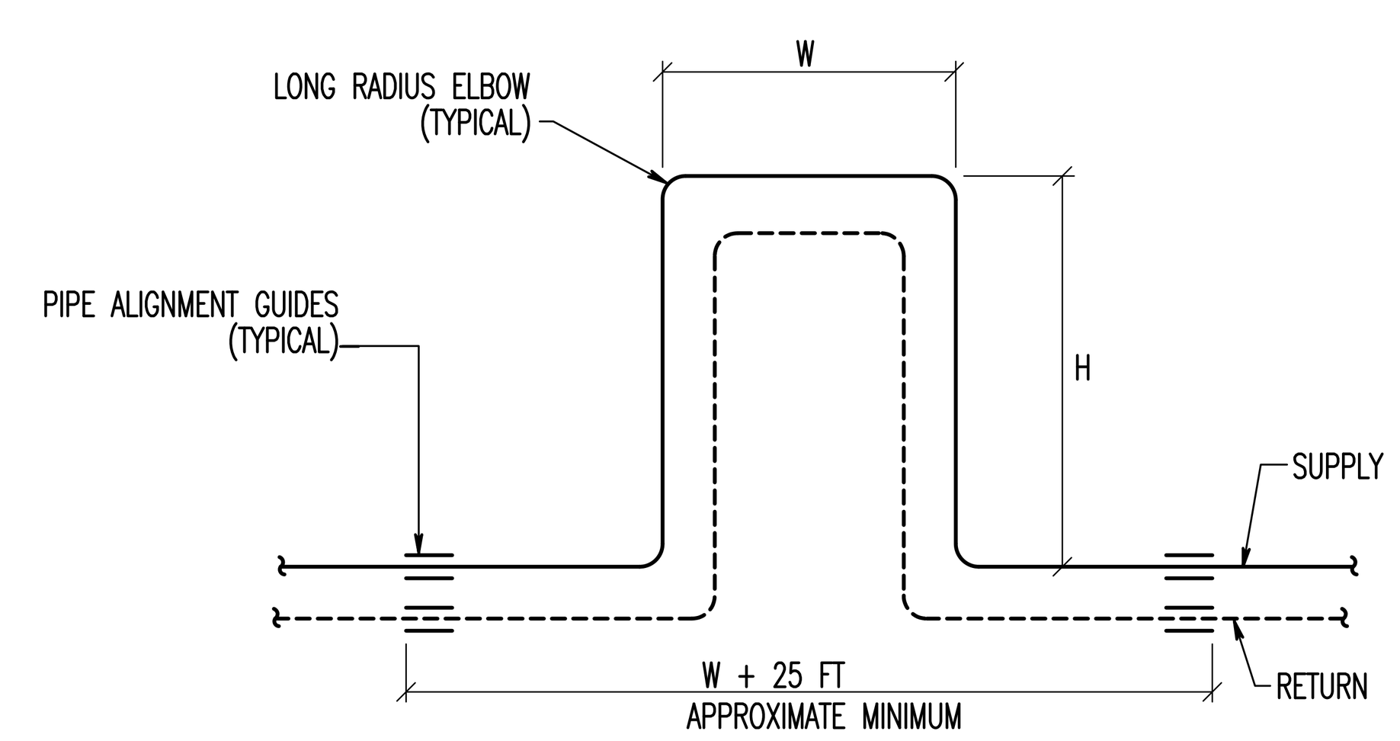
SPECIAL NOTES:

1. SMOKE DETECTOR. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
2. 10 GAUGE PLATE
3. CONTINUOUS GASKET
4. SHEET METAL SCREWS. TWO PER SIDE.
5. AIR FLOW MEASUREMENT PORT. (INSTRUMENT TEST HOLE)
6. ACCESS DOOR. 6" X 6" IN 14" AND SMALLER DUCTS. 12" X 12" IN LARGER DUCTS.
7. MINIMUM ONE DUCT PERIMETER TO OFFSET OR FITTING
8. MINIMUM 1-1/4" PROJECTION INTO AIRSTREAM. MAXIMUM 1/3 DUCT DEPTH



MEDIUM AND HIGH VELOCITY TYPE

6 SMOKE DETECTOR INSTALLATION RECTANGULAR OR SQUARE DUCT
M503 NO SCALE



7 PIPING EXPANSION LOOP
M503 NO SCALE

Additions:	Date
Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
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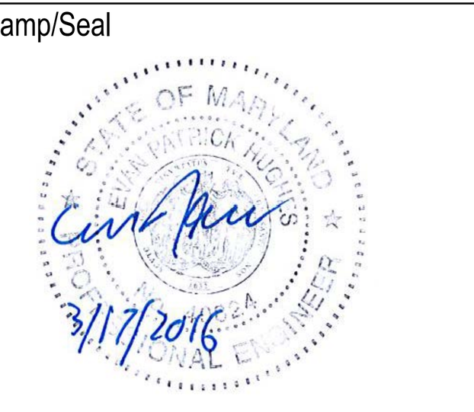

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 40828, Expiration Date: 01/15/2017

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FULLY SPRINKLERED

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale: | Building Number: 360 | Checked: EPH | Drawn: MJF

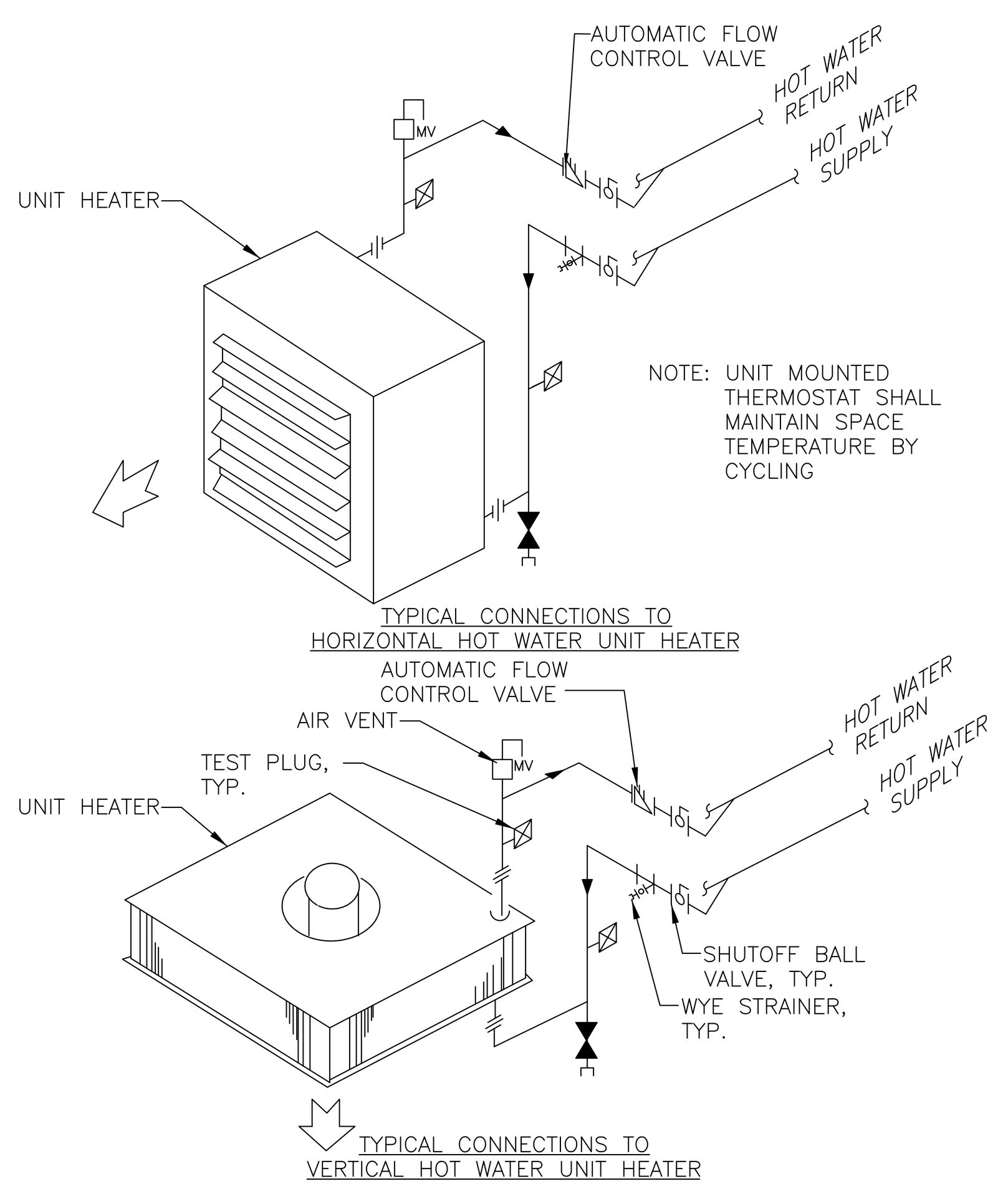
Location: PERRY POINT, MD

Date: 03/17/16

VA Project Number: 512-530

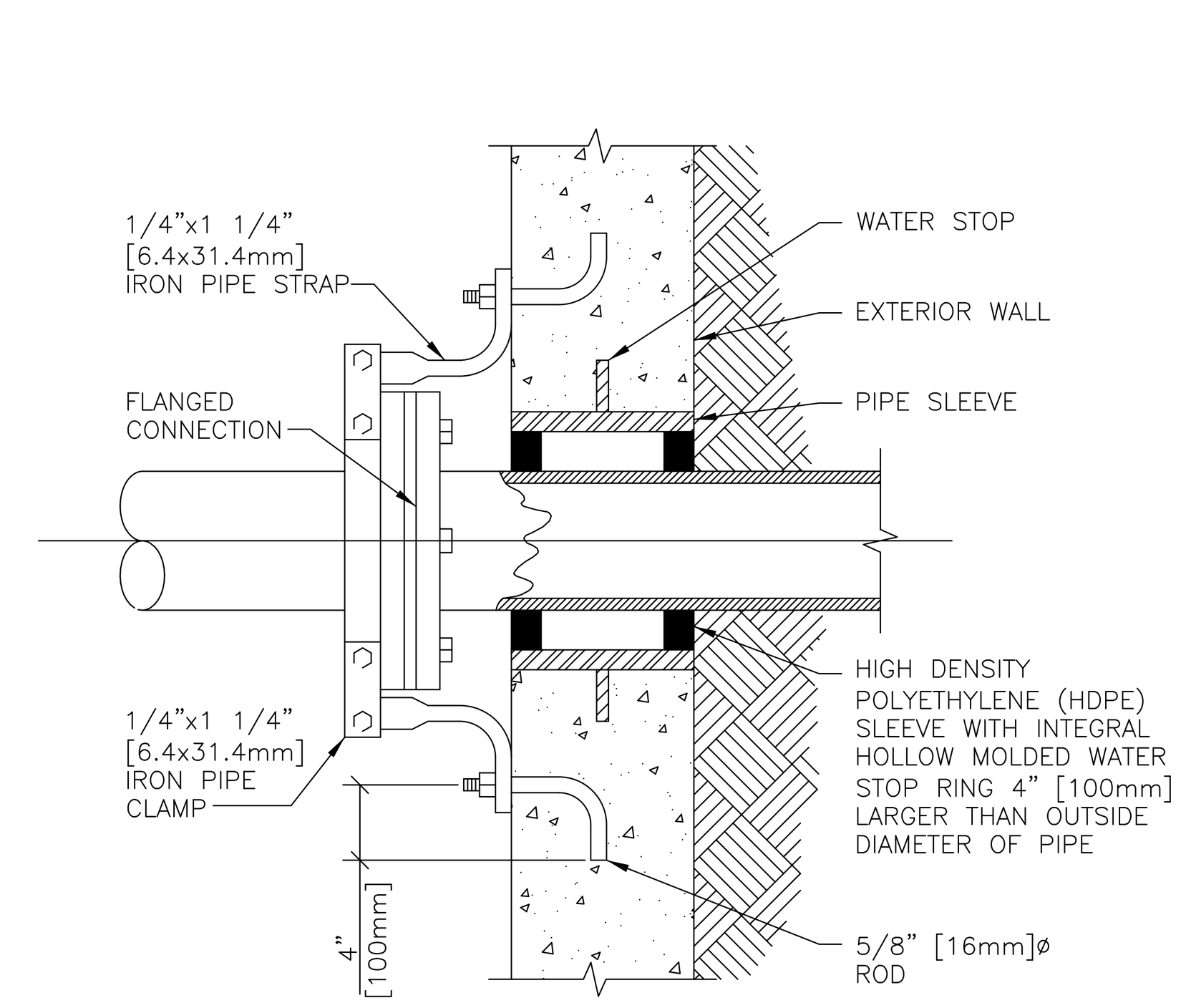
Drawing Number: M503

DEPARTMENT OF VETERANS AFFAIRS



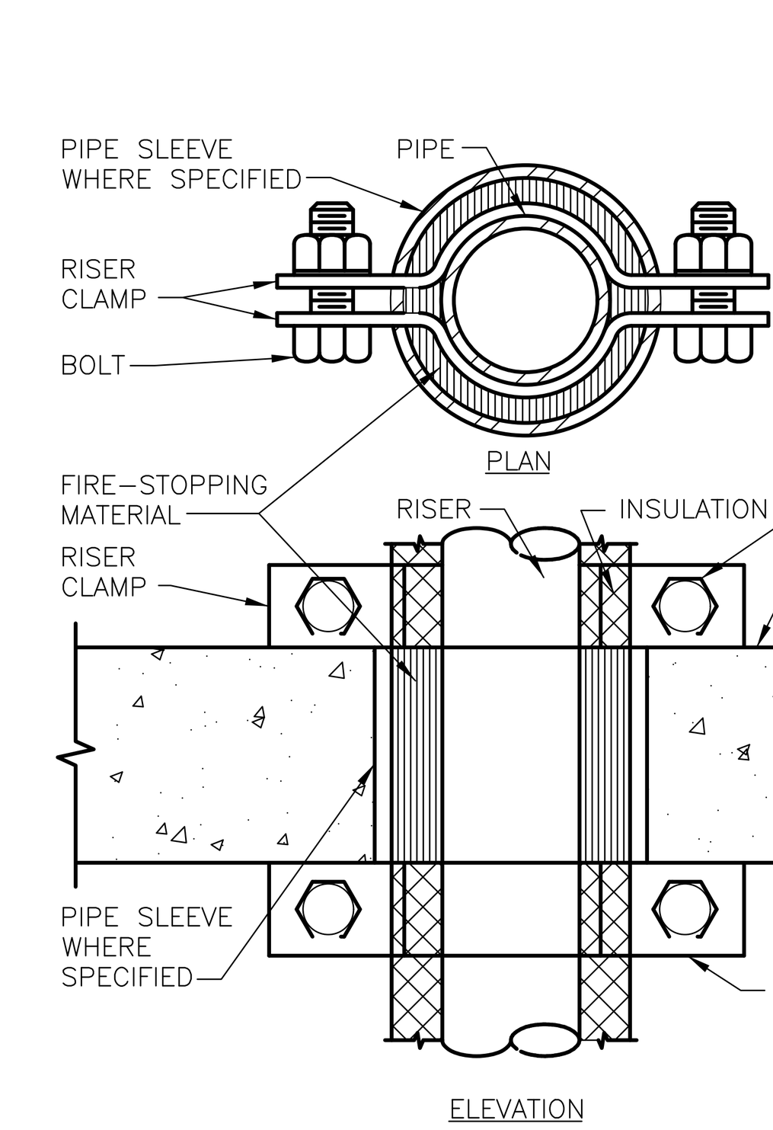
1 M504 UNIT HEATERS (HOT WATER) - PIPING CONNECTIONS

NTS



2 M504 SUPPORT ANCHOR (CONDENSER WATER OR CHILLED WATER)

NTS



NOTES:

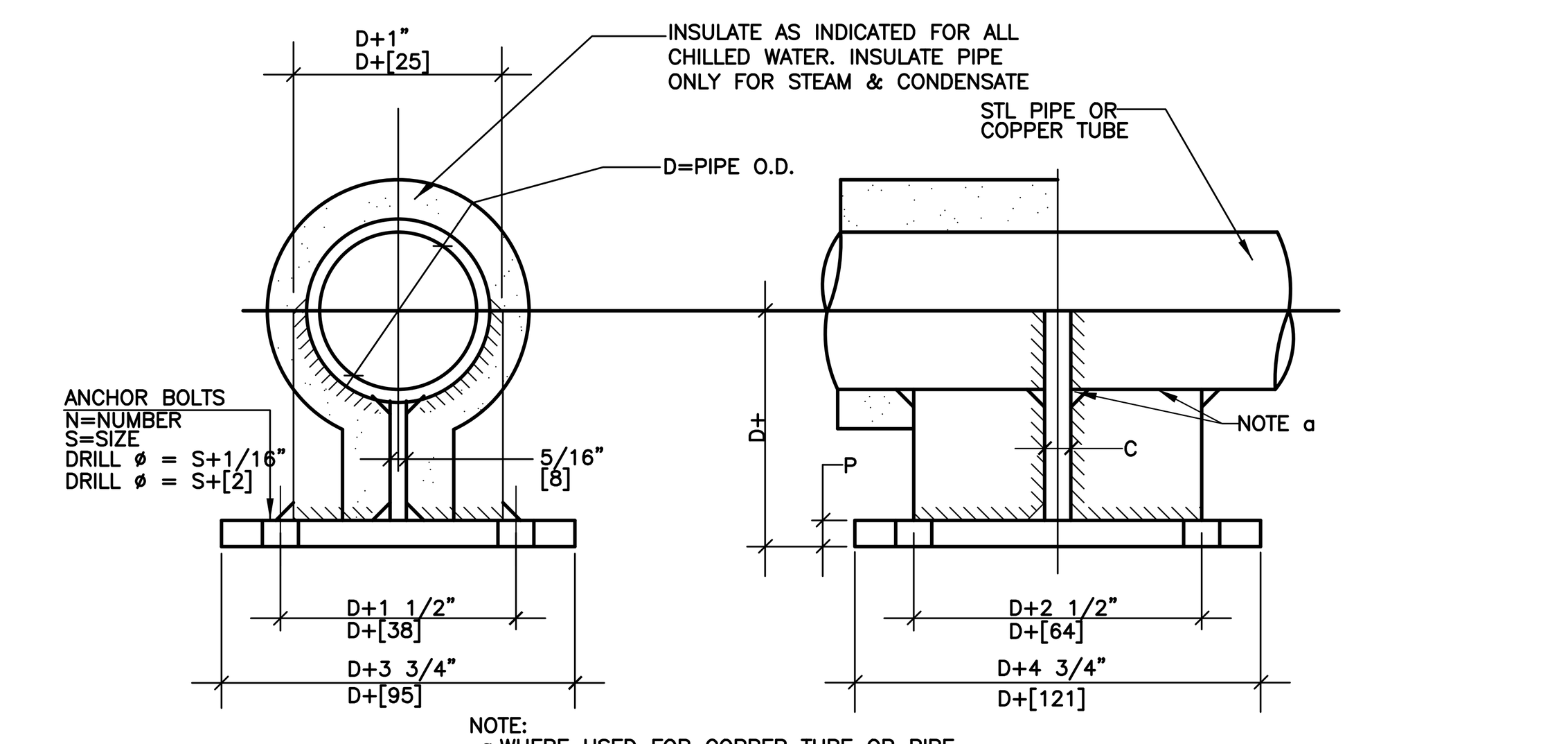
1. PROVIDE ANCHORS ONLY WHERE SHOWN ON DRAWINGS.
2. EXTEND SLEEVE ABOVE FLOOR WHERE SPECIFIED.

3 M504 SUPPORT/ANCHOR FOR PIPE RISERS

NTS

PIPE ANCHOR SCHEDULE

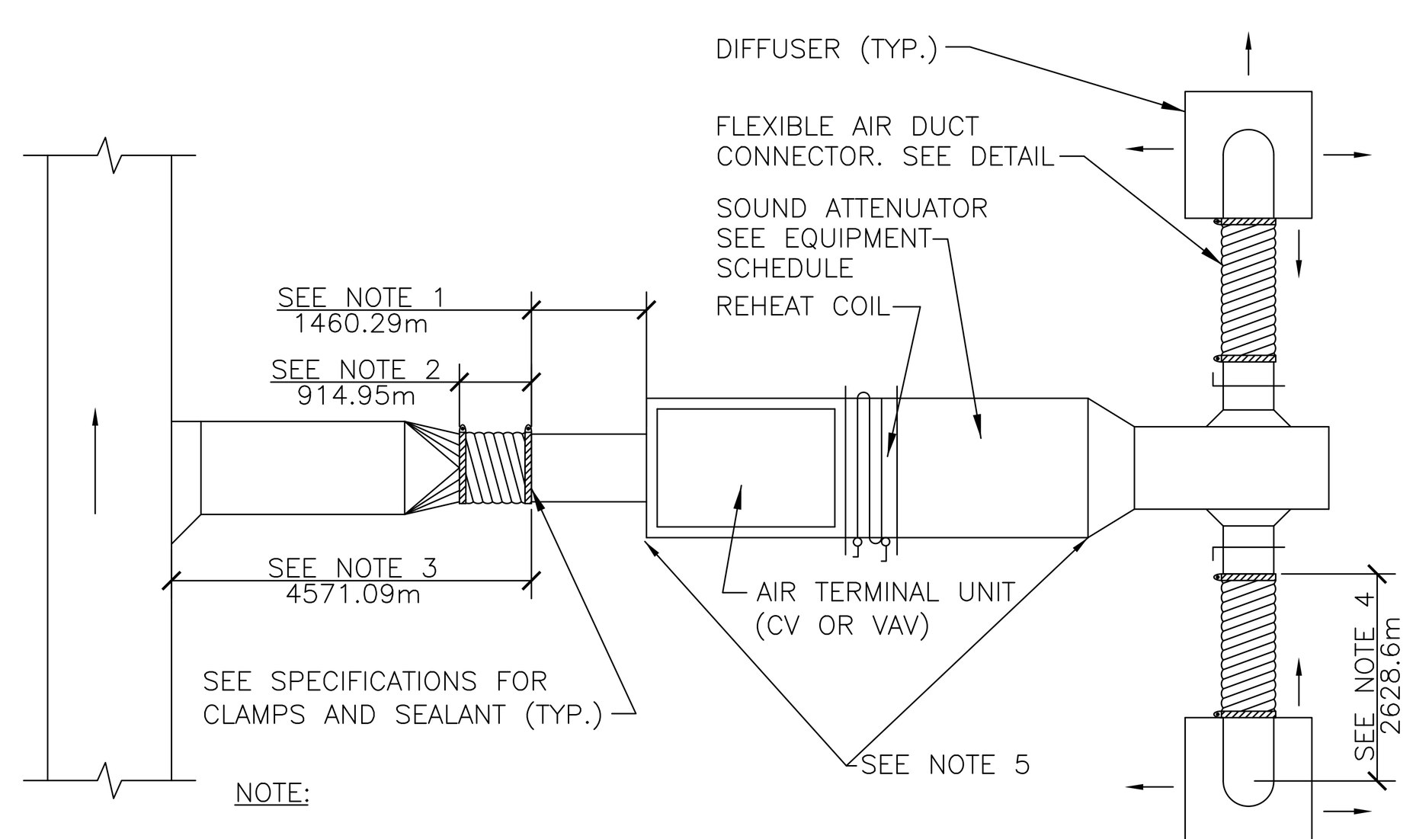
D IN	D MM	P IN	P MM	C IN	C MM	N IN	N MM	S IN	S MM	BOLT PATTERN
4"	102	5/8"	16	3/4"	19	4"	102	3/4"	19	
3"	76	1/2"	13	1/2"	13	4"	102	5/8"	16	
2½"	64	3/8"	10	3/8"	10	4"	102	5/8"	16	
2"	51	3/8"	10	3/8"	10	4"	102	5/8"	16	
1½"	38	3/8"	10	1/4"	6	4"	102	1/2"	13	



NOTE:
a.WHERE USED FOR COPPER TUBE OR PIPE, BRAZE TO FABRICATED STEEL ANCHOR

4 M504 SMALL PIPE ANCHOR 1½"- 4"

NTS



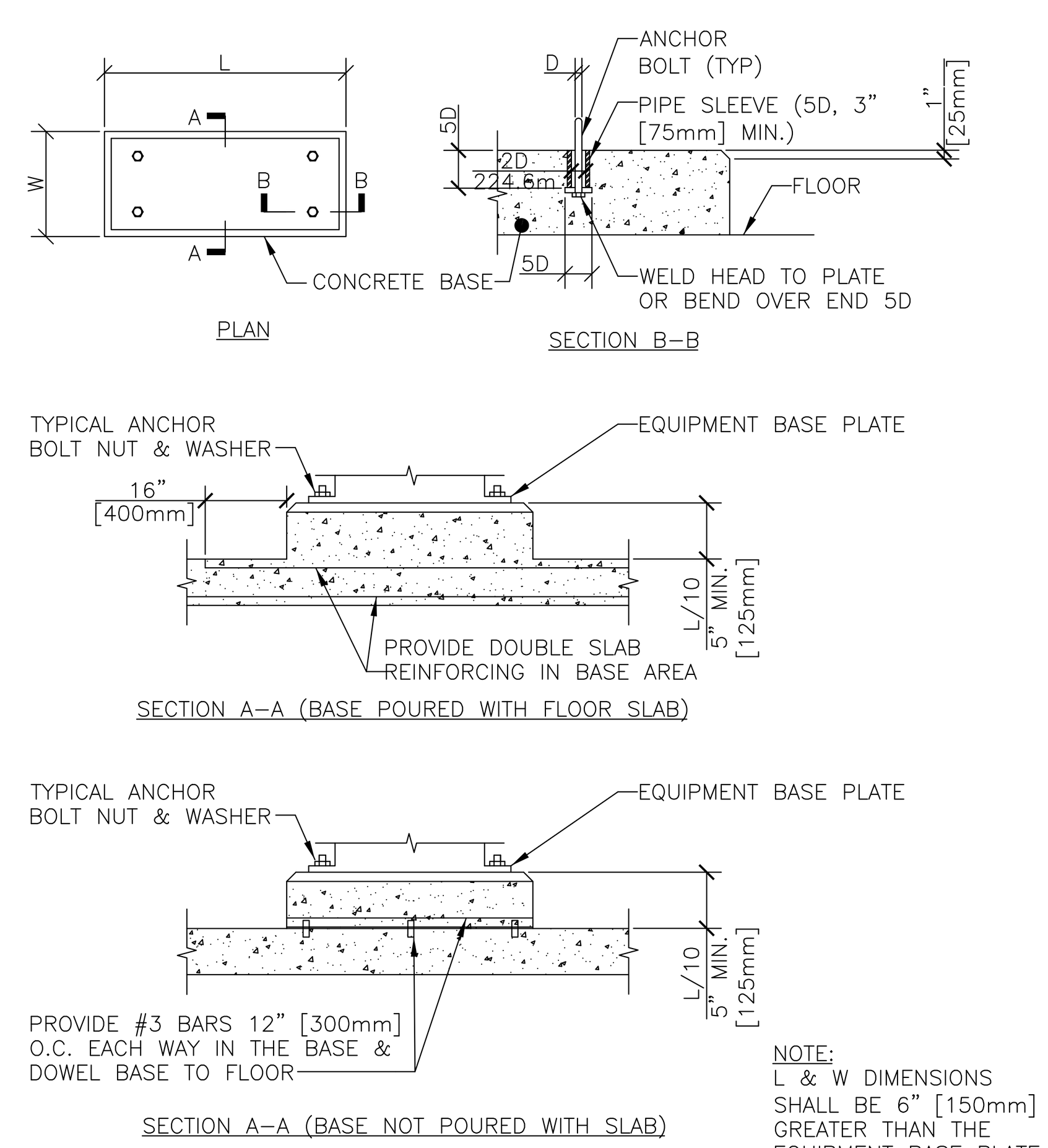
NOTE:

1. RIGID STRAIGHT TERMINAL UNIT INLET LENGTH SHALL BE A MINIMUM OF 3 TIMES THE DIAMETER OF INLET
2. A FLEXIBLE AIR DUCT CONNECTOR IS NOT MANDATORY FOR INLET TO THIS BOX, BUT ALLOWED TO ACCOMMODATE MINOR OFFSETS. MAXIMUM LENGTH 3'–0" [900mm].
3. A BRANCH DUCT SERVING AN INDIVIDUAL BOX MAY BE THE SAME SIZE AS THE BOX INLET, PROVIDED THE EQUIVALENT LENGTH OF THE BRANCH DUCT, AS SHOWN, DOES NOT EXCEED 10 FEET (3 METERS). FOR LONGER LENGTHS, INCREASE THE DUCT SIZE AND PROVIDE A DUCT TRANSITION TO MAINTAIN THE DUCT STATIC PRESSURE DROP AT OR BELOW 0.2"/100' [1.64Pa/m].
4. FLEXIBLE AIR DUCT CONNECTORS, WHEN USED FROM TERMINAL UNIT SUPPLY AIR DUCT TO DIFFUSER, SHALL NOT EXCEED 5'–0" [1500mm]. USE RIGID ELBOWS FOR CHANGE OF DIRECTION GREATER THAN 45°.
5. COMPONENT ARRANGEMENT MAY VARY BY MANUFACTURER. PROVIDE INSULATION W/VAPOR BARRIER FOR CONNECTING DUCT SECTIONS.
6. USE OF THE FLEXIBLE AIR DUCT CONNECTORS ARE NOT PERMITTED FOR THE DEDICATED AHU SERVING THE SURGICAL SUITE.

5 M504 DUCT CONNECTIONS - AIR TERMINAL UNITS

NTS

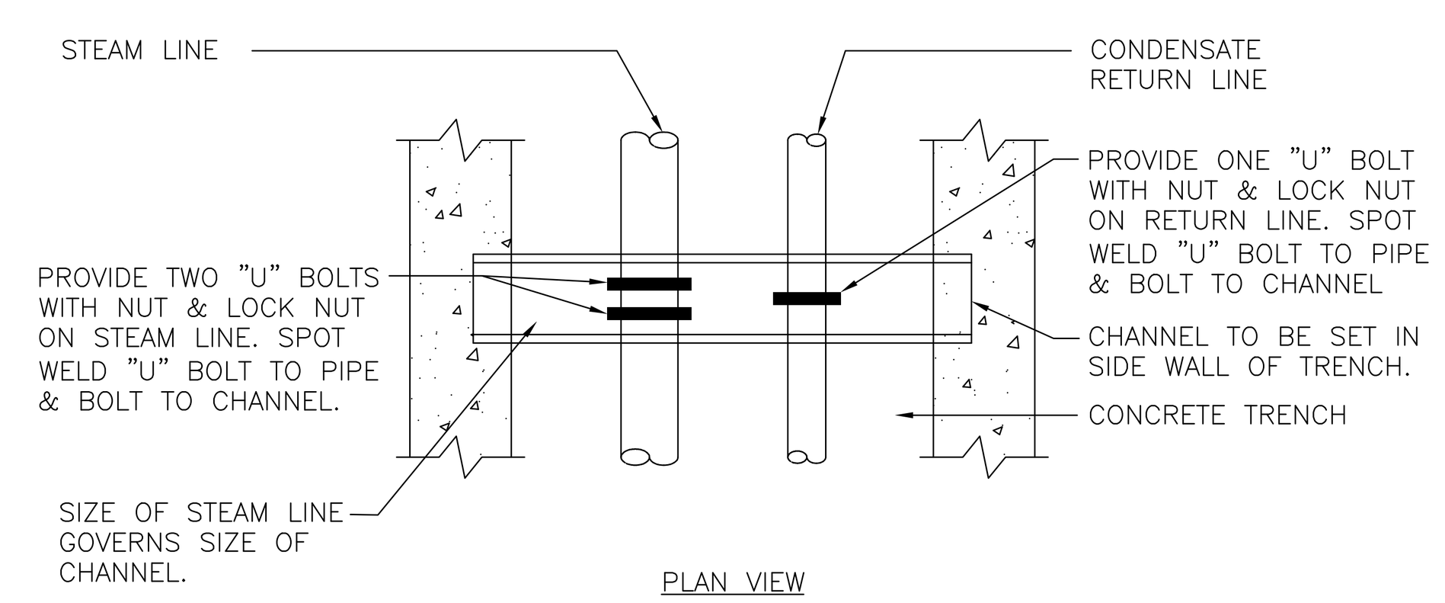
DESIGNER'S NOTE: 1.INDICATE SOUND ATTENUATOR AS REQUIRED BY ACOUSTICAL ANALYSIS



NOTE:
L & W DIMENSIONS SHALL BE 6" [150mm] GREATER THAN THE EQUIPMENT BASE PLATE.

6 M504 CONCRETE EQUIPMENT BASES

NTS



SCHEDULE

SIZE OF PIPE INCH [mm]	SIZE OF "U" BOLT INCH [mm]	SIZE OF CHANNEL INCH [mm]
1 – 2 [25 – 50]	3/8 [10] DIA.	6 x 10.5 [150x265]
2–1/2 – 5 [65 – 125]	1/2 [15] DIA.	8 x 13.75 [200x345]
6 – 8 [150 – 200]	3/4 [20] DIA.	10 x 20 [250x500]

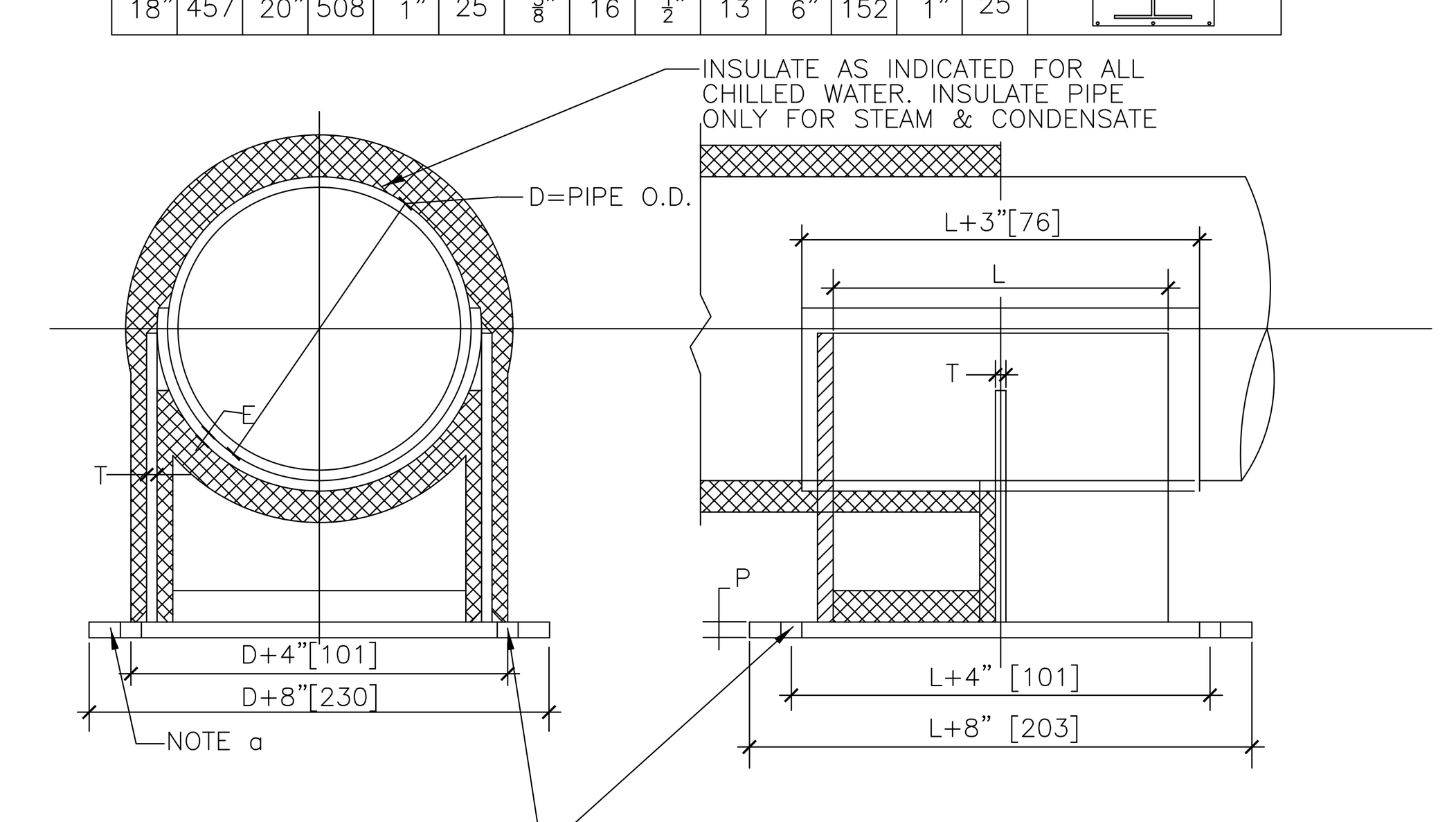
SCHEDULE FOR 8 FT. [2.4m] SPAN OR LESS.

7 M504 ANCHOR INSTALLATION STEAM/CONDENSATE PIPING IN TRENCH

NTS

PIPE ANCHOR SCHEDULE

D IN	D MM	L IN	L MM	P IN	P MM	T IN	T MM	E IN	E MM	N IN	N MM	S IN	S MM	BOLT PATTERN
6"	152	8½	216	3/4"	19	3/8"	10	1/4"	6	4"	102	7/8"	22	
8"	203	10"	254	3/4"	19	1/2"	13	1/4"	6	4"	102	7/8"	22	
10"	254	12"	305	3/4"	19	1/2"	13	1/4"	6	4"	102	7/8"	22	
12"	305	14"	356	3/4"	19	1/2"	13	1/4"	6	4"	102	7/8"	22	
14"	356	16"	406	3/4"	19	1/2"	13	1/2"	13	4"	102	7/8"	22	
16"	406	18"	457	3/4"	19	1/2"	13	1/2"	13	4"	102	7/8"	22	
18"	457	20"	508	1"	25	5/8"	16	1/2"	13	6"	152	1"	25	



NOTES:
a.INSTALL WALL PLATE FIRST THEN WELD ON REMAINING ASSEMBLY. ONE WALL PLATE FOR BOTH CHILLED WATER S.&R. IS OPTIONAL.

8 M504 LARGE PIPE ANCHOR 6" -18"

NTS

FULLY SPRINKLERED

Additions:	Date

Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
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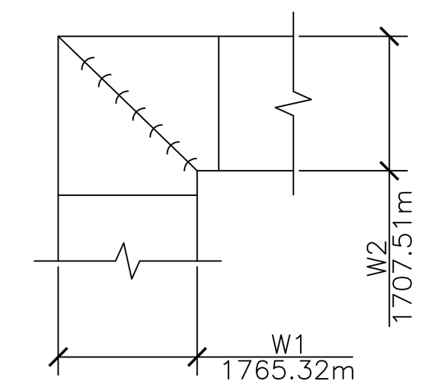
DEPARTMENT OF VETERANS AFFAIRS

THREE INCHES = ONE FOOT (3" = 1'-0")
ONE AND ONE HALF INCHES = ONE FOOT (1 1/2" = 1'-0")
ONE INCH = ONE FOOT (1" = 1'-0")
THREE QUATERS INCH = ONE FOOT (3/4" = 1'-0")
ONE HALF INCH = ONE FOOT (1/2" = 1'-0")
THREE EIGHTHS INCH = ONE FOOT (3/8" = 1'-0")
ONE QUATER INCH = ONE FOOT (1/4" = 1'-0")
ONE EIGHTH INCH = ONE FOOT (1/8" = 1'-0")

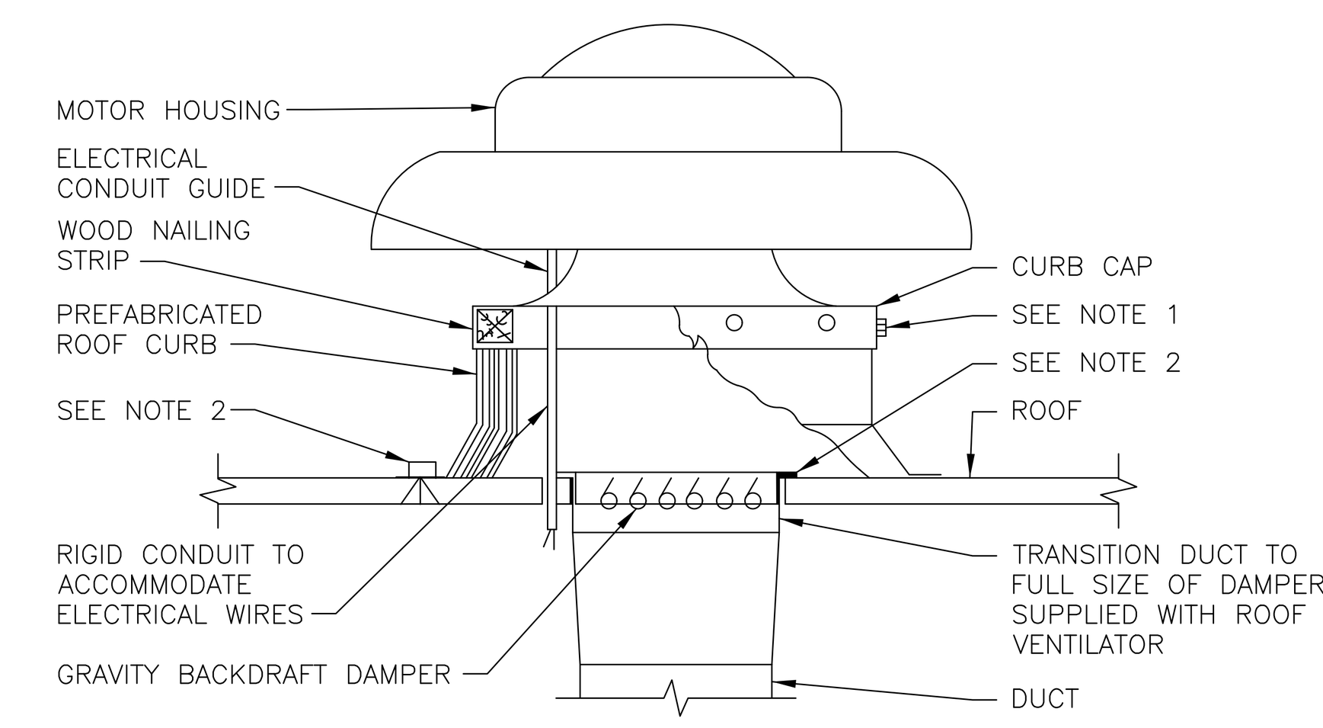


NOTE:

1. ALL VANE ELBOWS SHALL BE CONSTRUCTED AND INSTALLED AS DETAILED BY SMACNA.
2. WHEN W1 DOES NOT EQUAL W2, VANE SHALL BE SINGLE THICKNESS VANE TYPE REGARDLESS OF W DIMENSION.
3. ALL SINGLE THICKNESS VANES SHALL HAVE A 2" RADIUS, 1 1/2" MAXIMUM SPACE BETWEEN VANES AND A 3/4" TRAILING EDGE.
4. WHEN W EQUALS W2 AND W1 IS GREATER THAN 20" VANES SHALL BE DOUBLE VANE TYPE.

1 (M505) DUCTWORK SQUARE VANE ELBOWS

NO SCALE

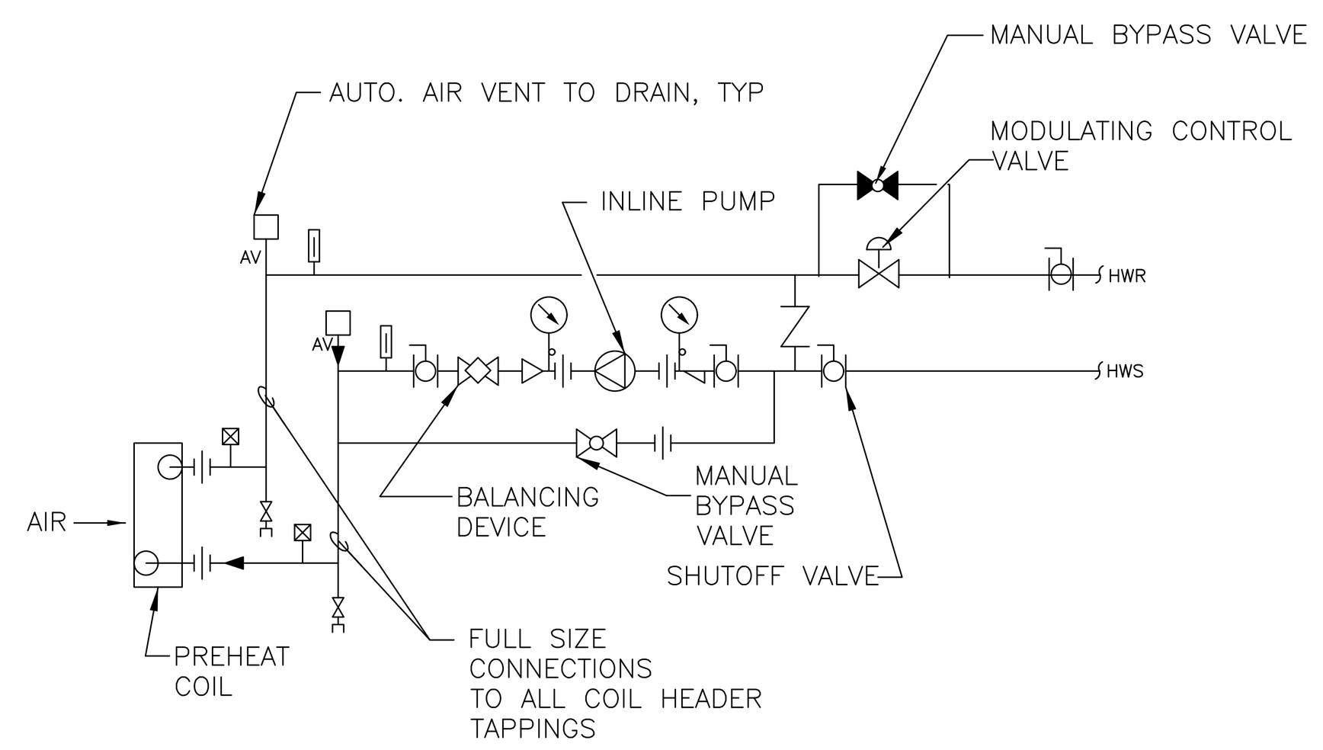


NOTE:

1. SECURE CURB CAP TO WOOD NAILING STRIP WITH 3/8" CADMIUM PLATED LAG BOLTS NOT OVER 12" ON CENTER.
2. SECURE ROOF CURB, DUCTWORK AND DAMPER TO ROOF WITH EXPANSION BOLTS (CONCRETE ROOF) OR RUST RESISTANT BOLTS (METAL DECK AND BAR JOIST ROOF).
3. RUN ELECTRICAL LINES THROUGH CLEARANCE HOLE PROVIDED IN GRAVITY DAMPER, THEN THROUGH VENTILATOR ELECTRICAL CONDUIT GUIDE.

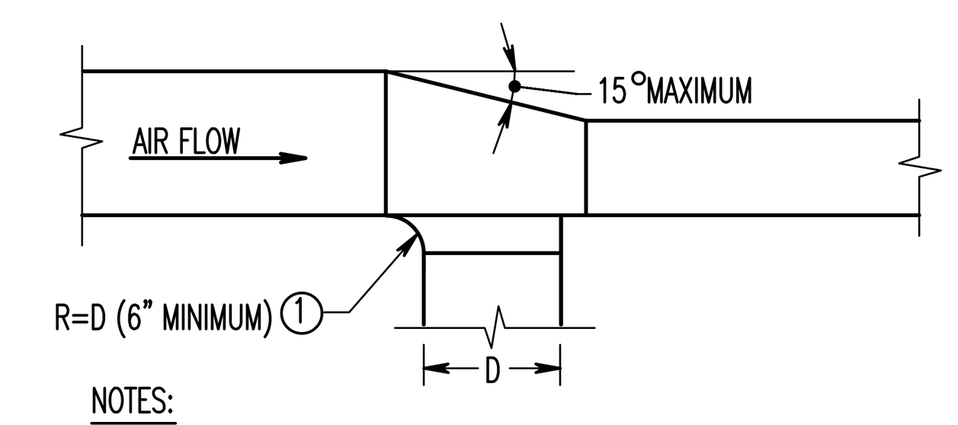
2 (M505) POWER ROOF VENTILATOR

NO SCALE



3 (M505) PREHEAT COIL (HOT WATER) - PIPING CONNECTIONS

NTS
DESIGNERS NOTE:
1.COORDINATE WITH HVAC DESIGN MANUAL.



NOTES:

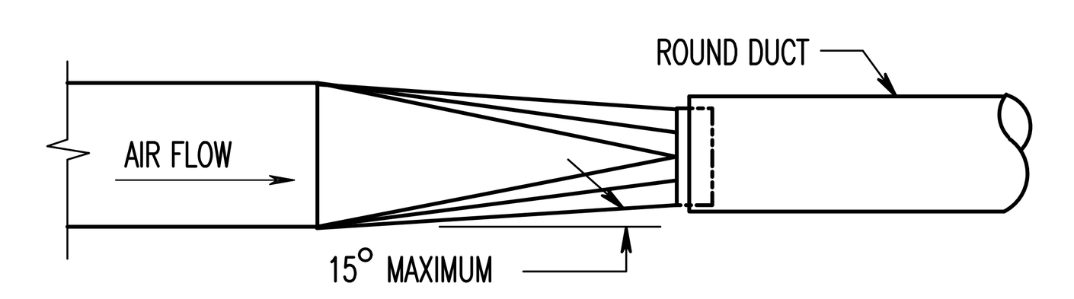
1. SEE SMACNA MANUAL FOR METHODS OF SECURING TAP-OFF CONNECTION TO MAIN.
2. SAME FOR RETURN AND EXHAUST DUCTS EXCEPT AIR FLOW IS REVERSED.

SPECIAL NOTES:

① 45°TAP PERMITTED FOR DUCTWORK RATED 2" W.G. OR LESS.

4 (M505) TAPOFF AND TRANSITION FROM SIDE OF DUCT

NO SCALE



NOTES:

1. FOR AIR FLOW IN OPPOSITE DIRECTION, TRANSITION COLLAR SHALL OVERLAP EXTERIOR OR ROUND DUCT.

5 (M505) RECTANGULAR TO ROUND DUCT TRANSITION

NO SCALE

Additions:	Date
Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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Stamp/Seal

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 40828, Expiration Date: 6/15/2017

Approved:

Approved: Chief, Facilities and Engineering

Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Approved: Associate Director for Operations

Approved: Director, Medical Center

FULLY SPRINKLERED

Drawing Title	Project Title	Date
MECHANICAL DETAILS	WAREHOUSE RENOVATION & EXPANSION	03/17/16
		VA Project Number: 512-530

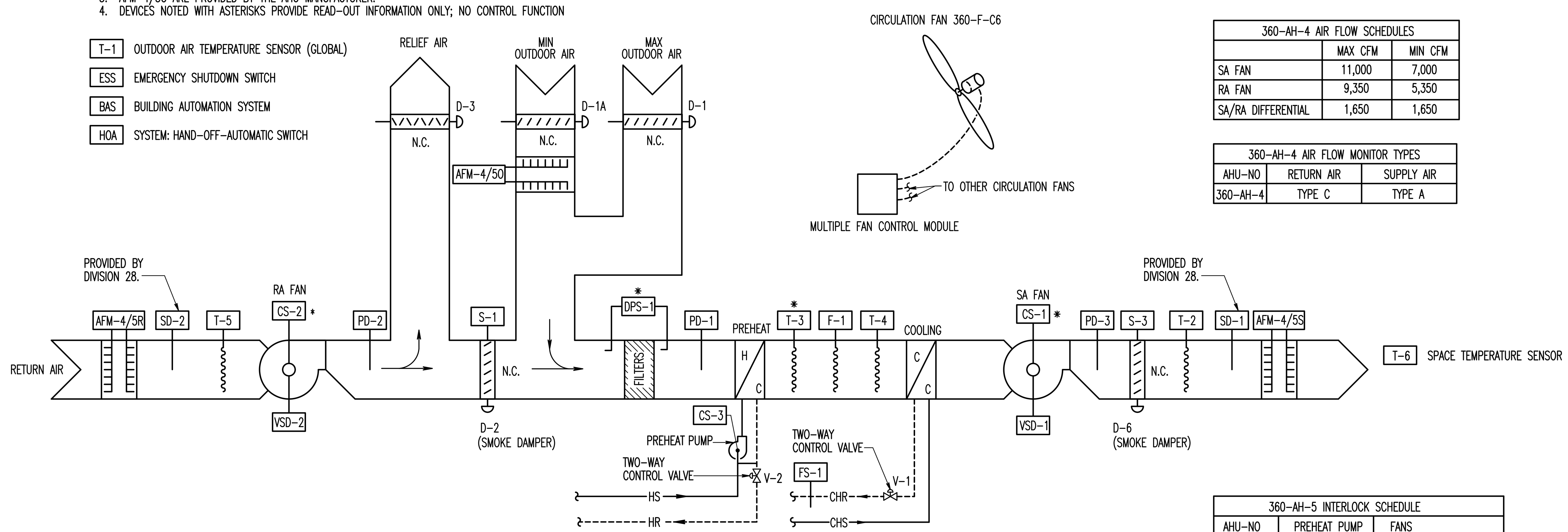
Scale	Building Number	Checked	Drawn	Drawing Number
	360	EPH	MJF	M505

Location: PERRY POINT, MD

DEPARTMENT OF VETERANS AFFAIRS

NOTES:
1. DAMPERS D-2, D-3 AND D-6 SHALL BE PROVIDED BY AUTOMATIC TEMPERATURE CONTROLS CONTRACTOR.
2. DAMPERS D-1A AND D-1 ARE PROVIDED BY THE AHU MANUFACTURER.
3. AFM-4/50 ARE PROVIDED BY THE AHU MANUFACTURER.
4. DEVICES NOTED WITH ASTERISKS PROVIDE READ-OUT INFORMATION ONLY; NO CONTROL FUNCTION

T-1 OUTDOOR AIR TEMPERATURE SENSOR (GLOBAL)
ESS EMERGENCY SHUTDOWN SWITCH
BAS BUILDING AUTOMATION SYSTEM
HOA SYSTEM: HAND-OFF-AUTOMATIC SWITCH



360-AH-4 INTERLOCK SCHEDULE		
AHU-NO	PREHEAT PUMP	FANS
360-AH-4	360-PHP-4	360-SF-4, 360-RF-4

360-AH-4 AIR FLOW SCHEDULES		
	MAX CFM	MIN CFM
SA FAN	11,000	7,000
RA FAN	9,350	5,350
SA/RA DIFFERENTIAL	1,650	1,650

360-AH-4 AIR FLOW MONITOR TYPES		
AHU-NO	RETURN AIR	SUPPLY AIR
360-AH-4	TYPE C	TYPE A

360-AH-5 INTERLOCK SCHEDULE		
AHU-NO	PREHEAT PUMP	FANS
360-AH-5	360-PHP-5	360-SF-5, 360-RF-5

360-AH-5 AIR FLOW SCHEDULES		
	MAX CFM	MIN CFM
SA FAN	11,000	7,000
RA FAN	9,350	9,350
SA/RA DIFFERENTIAL	1,650	1,650

360-AH-5 AIR FLOW MONITOR TYPES		
AHU-NO	RETURN AIR	SUPPLY AIR
360-AH-5	TYPE C	TYPE A

VARIABLE AIR VOLUME AIR HANDLING UNIT 360-AH-4 CONTROL DIAGRAM

(NOTE: AHU 360-AH-5 IS IDENTICAL)

INPUT/OUTPUT SUMMARY

SYSTEM		INDICATION											ALARM				CONTROL					REMARKS
VARIABLE VOLUME AIR HANDLING UNIT	GRAPHIC	STATUS	TEMPERATURE	RELATIVE HUNIDITY	PPM	CFM	STATIC PRESSURE	DIFFERENTIAL PRESSURE	GPM	POSITION	RUN TIME	HERTZ	LOW	HIGH	CRITICAL	MAINTENANCE	PROGRAM START/STOP	HAND-OFF-AUTO	MODULATE	MIN/MAX	OPEN/CLOSED	
SYSTEM	X									X							X	X				HOA, BAS
SUPPLY AIR FAN		X				X	X				X	X	X	X	X		X					CS-1, AFM-4S, VSD-1
RETURN AIR FAN		X				X	X				X	X		X	X		X					CS-2,AFM-4R, PD-2, VSD-2
OUTDOOR AIR			X			X																T-1, AFM-4O
RETURN AIR			X																			T-5
SUPPLY AIR			X																			T-2
PHC LAT			X										X		X							T-3, T-4, F-1
SMOKE DETECTOR															X							SD-1, SD-2
EMERGENCY SHUTDOWN		X													X						X	ESS
FILTERS								X						X		X						DPS-1
CHILLED WATER FLOW		X											X									FS-1
COIL VALVES										X									X			V-1, V-2
DAMPERS										X									X			D-1, D-1A, D-3
DAMPERS										X											X	D-2, D-6, S-1, S-3
SPACE TEMPERATURE			X																			T-6
PHC PUMP		X									X					X	X					CS-3

VARIABLE AIR VOLUME AIR HANDLING UNIT 360-AH-4 INPUT/OUTPUT SUMMARY

(NOTE: AHU 360-AH-5 IS IDENTICAL)

GENERAL:

1. THE AIR HANDLING SYSTEM SHALL BE STARTED AND STOPPED THROUGH A SYSTEM HAND-OFF-AUTOMATIC (HOA) SWITCH. WHEN INDEXED TO "HAND", THE SYSTEM SHALL BE ENERGIZED TO OPERATE UNDER THE CONTROL SEQUENCE. WHEN INDEXED TO "OFF", THE SYSTEM SHALL BE DE-ENERGIZED. WHEN INDEXED TO "AUTOMATIC", THE SYSTEM SHALL BE STARTED AND STOPPED THROUGH THE BUILDING AUTOMATION SYSTEM (BAS). THE H-O-A SWITCH POSITION SHALL BE MONITORED THROUGH THE BAS.
2. ALL SAFETIES AND ASSOCIATED CONTROL INTERLOCKS SHALL REMAIN ACTIVE IN ALL H-O-A SWITCH POSITIONS.
3. COORDINATE VARIABLE SPEED DRIVE (VSD) INTERFACE REQUIREMENTS WITH VSD MANUFACTURER.
4. PROVIDE A REMOTE EMERGENCY SHUTDOWN SWITCH (ESS) FOR SYSTEM SHUTDOWN. SWITCH SHALL BE INSTALLED AT A LOCATION APPROVED BY THE FIRE INSPECTOR. TYPICALLY INSTALL AT THE BUILDING ENTRANCE.
5. PREHEAT PUMP SHALL OPERATE CONTINUOUSLY WHENEVER OUTDOOR AIR (OA) TEMPERATURE AT T-1 IS BELOW 50 DEGREES F. FANS SHALL STOP IF PUMP FAILS TO OPERATE AS SENSED BY CURRENT SENSOR CS-3 AND SEND AN ALARM TO THE BAS.
6. LOW LIMIT STAT T-4 SHALL OVERRIDE PREHEAT COIL CONTROL LOOP TO OPEN PREHEAT VALVE V-2 WHEN PREHEAT DISCHARGE TEMPERATURE DROPS TO 40 DEGREES F.
7. ELECTRIC FREEZESTAT F-1 SHALL STOP SA AND RA FANS AT 35 DEGREES F AND SEND AN ALARM TO THE BAS.

STARTING AND STOPPING:

1. WHEN THE UNIT SUPPLY AIR FAN IS ENERGIZED TO OPERATE, THE RETURN AIR FAN SHALL BE INTERLOCKED TO OPERATE, UNLESS OTHERWISE NOTED. AIR HANDLING UNIT SUPPLY AND RETURN AIR FANS SHALL BE SOFT STARTED THROUGH THEIR ASSOCIATED VARIABLE SPEED DRIVE.
2. WHEN SYSTEM OPERATION IS STARTED BY THE H-O-A SWITCH OR BAS, D-2 AND D-6 OPEN. WHEN D-2 AND D-6 ARE OPEN, END SWITCHES S-1 AND S-3 START RA AND SA FANS RESPECTIVELY. LOCK OUT RELAY ACTUATED BY FAN STARTER PREVENTS END SWITCHES FROM STOPPING FANS.
3. PRESSURE SWITCH PD-1 STOPS SA FAN SHOULD MIXING PLENUM PRESSURE FALL BELOW MINUS 2"WG.
4. PRESSURE SWITCH PD-2 STOPS RA FAN SHOULD DUCT PRESSURE RISE ABOVE 2"WG.
5. PRESSURE SWITCH PD-3 STOPS SA FAN SHOULD DUCT PRESSURE RISER ABOVE 2"WG.
6. WHENEVER FANS ARE STOPPED D-1A, D-1 AND D-3 CLOSE, AND AFTER 2 MINUTES DELAY (ADJUSTABLE 0-5 MINUTES), D-2 AND D-6 CLOSE.

PREPARATORY (0600 TO 0730)/(ADJUSTABLE):

1. AHU STARTS. SA AND RA FANS ON. D-1A, D-1, D-3 ARE CLOSED, D-2 AND D-6 ARE OPEN.
2. WARM-UP: WHEN RETURN AIR TEMPERATURE AT T-5 IS BELOW 72 DEGREES F, T-5 SHALL RESET T-2 TO 95 DEGREES F UNTIL TEMPERATURE AT T-5 REACHES 72 DEGREES F (ADJUSTABLE) AT WHICH POINT SYSTEM SHALL OPERATE IN THE OCCUPIED MODE.
3. PULL-DOWN: WHEN RETURN AIR TEMPERATURE AT T-5 IS ABOVE 75 DEGREES F, T-2 SHALL MODULATE VALVE V-1 TO MAINTAIN 54 DEGREES F. WHEN TEMPERATURE AT T-5 REACHES 75 DEGREES F (ADJUSTABLE) THE AHU SHALL OPERATE IN THE OCCUPIED MODE.

OCCUPIED (0730 TO 1800)/(ADJUSTABLE):

1. SA AND RA FANS ON AND INDEXED TO AIRFLOW AS PER SETBACK SCHEDULE. RECIRCULATION FANS OPERATION PER SEQUENCE BELOW.
2. WHEN RETURN AIR TEMPERATURE SENSOR T-5 SENSES RETURN AIR BELOW 68 DEGREES F (ADJUSTABLE) UNIT SHALL BE INDEXED TO FULL AIRFLOW, V-2 SHALL MODULATE TO PROVIDE HEATING, AND CIRCULATION FANS SHALL BE ENERGIZED THROUGH MULTI-FAN CONTROLLER.
3. WHEN RETURN AIR TEMPERATURE SENSOR T-5 SENSES RETURN AIR BETWEEN 69-72 DEGREES F (ADJUSTABLE), UNIT SHALL BE INDEXED TO MINIMUM AIRFLOW, V-2 SHALL MODULATE TO PROVIDE HEATING, AND CIRCULATION FANS SHALL BE ENERGIZED THROUGH MULTI-FAN CONTROLLER.
4. WHEN RETURN AIR TEMPERATURE SENSOR T-5 SENSES RETURN AIR BETWEEN 73-75 DEGREES F (ADJUSTABLE), UNIT SHALL BE INDEXED TO MINIMUM AIRFLOW, V-1 SHALL MODULATE TO PROVIDE COOLING, AND CIRCULATION FANS SHALL BE ENERGIZED THROUGH MULTI-FAN CONTROLLER.
5. WHEN RETURN AIR TEMPERATURE SENSOR T-5 SENSES RETURN AIR ABOVE 76 DEGREES F (ADJUSTABLE) UNIT SHALL BE INDEXED TO FULL AIRFLOW AND V-1 SHALL MODULATE TO PROVIDE COOLING.

FAN CAPACITY CONTROL:

1. AIRFLOW MEASURING STATION AFM-4/5S SHALL MODULATE THE SUPPLY AIR FAN SPEED THROUGH THE ASSOCIATED VARIABLE SPEED DRIVE VSD-1. THE AIR FLOW MEASURING STATIONS AFM-4/5S SHALL RESET AIR FLOW MEASURING STATION AFM-4/5R. AFM-4/5R SHALL MODULATE THE RETURN AIR FAN SPEED THROUGH ASSOCIATED VARIABLE SPEED DRIVE VSD-2 ACCORDING TO THE INDICATED SCHEDULE.

UNOCCUPIED (1800 TO 600)/(ADJUSTABLE):

1. SA AND RA FANS OFF. D-1A, D-1, D-2, D-3 AND D-6 ARE CLOSED. COOLING COIL VALVE V-1 SHALL BE CLOSED. HEATING COIL VALVE V-2 SHALL BE OPEN TO COIL WHEN OA TEMPERATURE IS BELOW 50 DEGREES F AND CLOSED TO COIL WHEN OA TEMPERATURE IS ABOVE 55 DEGREES F.
2. WINTER NIGHT SETBACK TEMPERATURE 65 DEGREES F (ADJUSTABLE) SHALL BE MAINTAINED BY CYCLING THE AIR HANDLING UNIT INITIATED BY THE SPACE THERMOSTAT T-6 UNTIL SPACE THERMOSTAT IS SATISFIED.
3. SUMMER NIGHT SETBACK TEMPERATURE 85 DEGREES F (ADJUSTABLE) SHALL BE MANITAINED BY CYCLING THE AIR HANDLING UNIT AND OPENING V-1 INITIATED BY THE SPACE THERMOSTAT T-6 UNTIL SPACE THERMOSTAT IS SATISFIED.

SMOKE DETECTORS:

1. WHEN SMOKE IS SENSED, BY EITHER SMOKE DETECTOR SD-1 OR SD-2, SA AND RA FANS STOP AND D-2 AND D-6 CLOSE. AHU SYSTEM SHALL RETURN TO NORMAL OPERATION WHEN SD-1 AND SD-2 ARE MANUALLY RESET

OUTDOOR AIR CONTROL:

1. AFM-4/50 SHALL MODLUALTE DAMPER D-1A TO MAINTAIN SCHEDULED MINIMUM AIRFLOW. DAMPER D-1 SHALL BE MODULATED AS PER OPTIMAL OUTDOOR AIR ENTHALPY REGIME TO PROVIDE AIRSIDE ECONOMIZER FUNCTION.

VARIABLE AIR VOLUME AIR HANDLING UNIT 360-AH-4 SEQUENCE OF OPERATION

(NOTE: AHU 360-AH-5 IS IDENTICAL)

FULLY SPRINKLERED

Additions:	Date

Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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Stamp/Seal

STATE OF MARYLAND · EVAN PATRICK HUGHES · PROFESSIONAL ENGINEER
3/17/2016

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 40828, Expiration Date: 6/15/2017

Approved:

Approved: Chief, Facilities and Engineering

Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: MECHANICAL AUTOMATIC TEMPERATURE CONTROLS

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360

Checked: EPH

Drawn: EPH

Location: PERRY POINT, MD

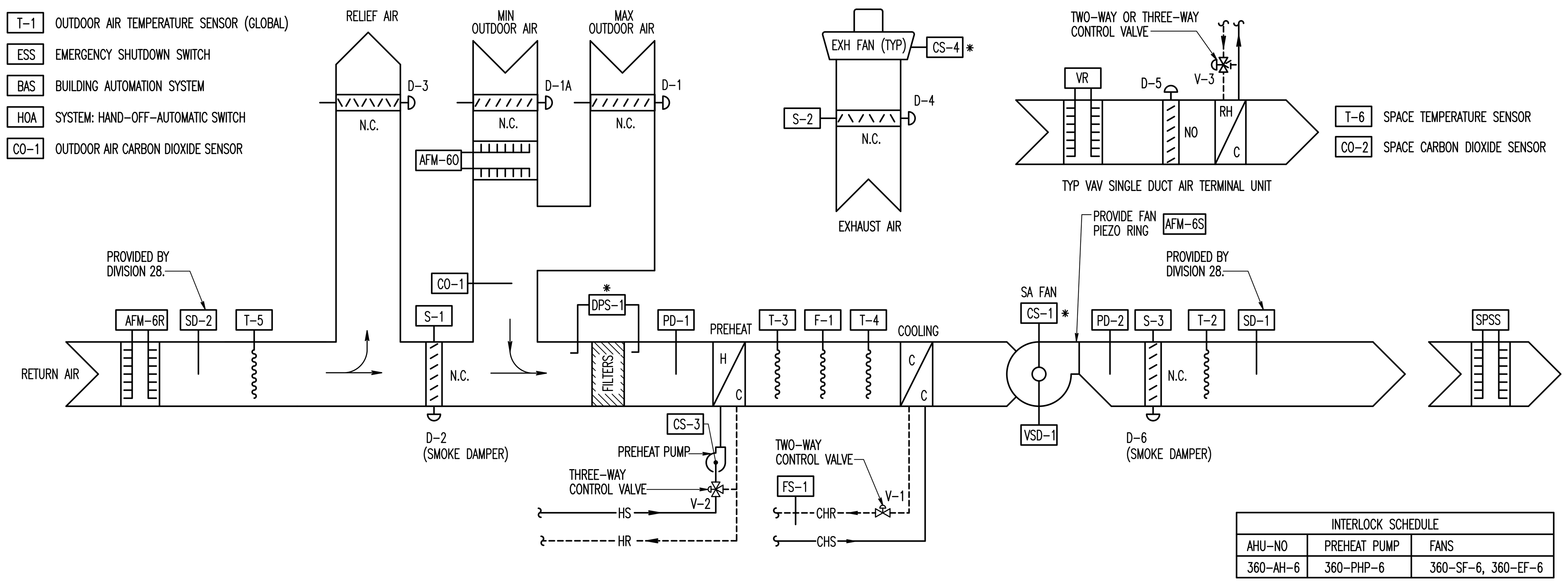
Date: 03/17/16

VA Project Number: 512-530

Drawing Number: M700

DEPARTMENT OF VETERANS AFFAIRS

NOTES:
1. DAMPERS D-6 SHALL BE PROVIDED BY AUTOMATIC TEMPERATURE CONTROLS CONTRACTOR.
2. DAMPERS D-1A, D-1, D-2 AND D-3 ARE PROVIDED BY THE AHU MANUFACTURER.
3. AFM-60 IS PROVIDED BY THE AHU MANUFACTURER.
4. AFM-6S FUNCTION IS PROVIDED BY PIEZO RING AT FAN BY MANUFACTURER.
5. DEVICES NOTED WITH ASTERISKS PROVIDE READ-OUT INFORMATION ONLY; NO CONTROL FUNCTION



INTERLOCK SCHEDULE		
AHU-NO	PREHEAT PUMP	FANS
360-AH-6	360-PHP-6	360-SF-6, 360-EF-6

AIR FLOW SCHEDULES		
	MAX CFM	MIN CFM
SA FAN	4,400	3,120
RA FAN	3,520	2,240
SA/RA DIFFERENTIAL	880	880

AIR FLOW MONITOR TYPES		
AHU-NO	RETURN AIR	SUPPLY AIR
360-AH-6	TYPE -	TYPE -

VARIABLE AIR VOLUME AIR HANDLING UNIT 360-AH-6 CONTROL DIAGRAM

GENERAL:

1. THE AIR HANDLING SYSTEM SHALL BE STARTED AND STOPPED THROUGH A SYSTEM HAND-OFF-AUTOMATIC (HOA) SWITCH. WHEN INDEXED TO "HAND", THE SYSTEM SHALL BE ENERGIZED TO OPERATE UNDER THE CONTROL SEQUENCE. WHEN INDEXED TO "OFF", THE SYSTEM SHALL BE DE-ENERGIZED. WHEN INDEXED TO "AUTOMATIC", THE SYSTEM SHALL BE STARTED AND STOPPED THROUGH THE BUILDING AUTOMATION SYSTEM (BAS). THE H-O-A SWITCH POSITION SHALL BE MONITORED THROUGH THE BAS.
2. ALL SAFETIES AND ASSOCIATED CONTROL INTERLOCKS SHALL REMAIN ACTIVE IN ALL H-O-A SWITCH POSITIONS.
3. COORDINATE VARIABLE SPEED DRIVE (VSD) INTERFACE REQUIREMENTS WITH VSD MANUFACTURER.
4. PROVIDE A REMOTE EMERGENCY SHUTDOWN SWITCH (ESS) FOR SYSTEM SHUTDOWN. SWITCH SHALL BE INSTALLED AT A LOCATION APPROVED BY THE FIRE INSPECTOR. TYPICALLY INSTALL AT THE BUILDING ENTRANCE.
5. PREHEAT PUMP SHALL OPERATE CONTINUOUSLY WHENEVER OUTDOOR AIR (OA) TEMPERATURE AT T-1 IS BELOW 50 DEGREES F. FANS SHALL STOP IF PUMP FAILS TO OPERATE AS SENSED BY CURRENT SENSOR CS-3 AND SEND AN ALARM TO THE BAS.
6. LOW LIMIT STAT T-4 SHALL OVERRIDE PREHEAT COIL CONTROL LOOP TO OPEN PREHEAT VALVE V-2 WHEN PREHEAT DISCHARGE TEMPERATURE DROPS TO 40 DEGREES F.
7. ELECTRIC FREEZESTAT F-1 SHALL STOP SA FAN AT 35 DEGREES F AND SEND AN ALARM TO THE BAS.

STARTING AND STOPPING:

1. WHEN THE UNIT SUPPLY AIR FAN IS ENERGIZED TO OPERATE, THE EXHAUST AIR FAN SHALL BE INTERLOCKED TO OPERATE, UNLESS OTHERWISE NOTED. AIR HANDLING UNIT SUPPLY AIR FAN SHALL BE SOFT STARTED THROUGH ITS ASSOCIATED VARIABLE SPEED DRIVE.
2. WHEN SYSTEM OPERATION IS STARTED BY THE H-O-A SWITCH OR BAS, D-2 AND D-6 OPENS. WHEN D-2 AND D-6 ARE OPEN, END SWITCH S-1 AND S-3 STARTS SA FAN. LOCK OUT RELAY ACTUATED BY FAN STARTER PREVENTS END SWITCHES FROM STOPPING FAN.
3. PRESSURE SWITCH PD-1 STOPS SA FAN SHOULD MIXING PLENUM PRESSURE FALL BELOW MINUS 2"WG.
4. PRESSURE SWITCH PD-2 STOPS SA FAN SHOULD DUCT PRESSURE RISE ABOVE 2"WG.
5. WHENEVER FANS ARE STOPPED D-1A, D-1, D-3 AND D-4 CLOSE, AND AFTER 2 MINUTES DELAY (ADJUSTABLE 0-5 MINUTES), D-2 AND D-6 CLOSE.

PREPARATORY(0600 TO 0730)/(ADJUSTABLE):

1. AHU STARTS. SA FAN ON. EXHAUST FAN IS OFF. D-1A, D-1, D-3 AND D-4 ARE CLOSED, D-2, AND D-6 ARE OPEN.
2. WARM-UP: WHEN RETURN AIR TEMPERATURE AT T-5 IS BELOW 72 DEGREES F, T-5 SHALL RESET T-2 TO 70 DEGREES F AND AIR TERMINAL UNIT DAMPER D-5 AND HEATING COIL VALVE V-3 SHALL FULLY OPEN UNTIL TEMPERATURE AT T-6 REACHES 72 DEGREES F (ADJUSTABLE) AT WHICH POINT T-6 SHALL MODULATE D-5 AND V-3 TO MAINTAIN SPACE TEMPERATURE.
3. PULL-DOWN: WHEN RETURN AIR TEMPERATURE AT T-5 IS ABOVE 75 DEGREES F, T-2 SHALL MODULATE VALVE V-1 TO MAINTAIN 55 DEGREES F. AIR TERMINAL UNIT DAMPER D-5 AND HEATING COIL VALVE V-3 SHALL MODULATE IN SEQUENCE TO MAINTAIN SPACE TEMPERATURE. WHEN TEMPERATURE AT T-5 REACHES 75 DEGREES F (ADJUSTABLE) THE AHU SHALL OPERATE IN THE OCCUPIED MODE.

OCCUPIED (0730 TO 1800)/(ADJUSTABLE):

1. SA FAN ON. DAMPER D-4 OPENS. WHEN D-4 IS OPEN, END SWITCH S-2 STARTS EXHAUST AIR FAN. LOCKOUT RELAY ACTUATED BY FAN STARTER PREVENTS S-2 FROM STOPPING FAN.
2. WHEN OA AT T-1 IS BELOW 60 DEGREES F (ADJUSTABLE), T-3 MODULATES D-1A, D-1, D-2, D-3 AND V-2 AND T-2 MODULATES V-1, ALL IN SEQUENCE ON TEMPERATURE RISE TO MAINTAIN 54 DEGREES F (ADJUSTABLE).
3. WHEN OA AT T-1 IS ABOVE 65 DEGREES F (ADJUSTABLE), T-1 OPENS D-1A AS DESCRIBED UNDER "OUTDOOR AIR CONTROL" AND OPENS D-3 TO CORRESPONDING MINIMUM POSITION AND T-2 MODULATES V-1 TO MAINTAIN 55 DEGREES F (ADJUSTABLE). FLOW SWITCH FS-1 SHALL SEND AN ALARM TO THE BAS IF NO FLOW IS SENSED.

FAN CAPACITY CONTROL:

1. STATIC PRESSURE SENSING STATION SPSS SHALL MODULATE THE SUPPLY AIR FAN SPEED THROUGH THE ASSOCIATED VARIABLE SPEED DRIVE VSD-1. THE AIR FLOW MEASURING STATION AFM-6S SHALL RESET AIR FLOW MEASURING STATION AFM-6R. AFM-6R SHALL MODULATE THE RETURN AIR DAMPER D-2 ACCORDING TO THE INDICATED SCHEDULE.
2. THE BAS SHALL POLE THE POSITION OF ALL D-5 DAMPERS AND RESET SPSS SETPOINT UNTIL ONE D-5 DAMPER IS OPEN TO 90 PERCENT OF FULL AIR FLOW.

UNOCCUPIED (1800 TO 0600)/(ADJUSTABLE):

1. SA FAN OFF. EXHAUST FAN OFF, D-1A, D-1, D-2, D-3, D-4 AND D-6 ARE CLOSED. COOLING COIL VALVE V-1 SHALL BE CLOSED. HEATING COIL VALVE V-2 SHALL BE OPEN TO COIL WHEN OA TEMPERATURE IS BELOW 50 DEGREES F AND CLOSED TO COIL WHEN OA TEMPERATURE IS ABOVE 55 DEGREES F.
2. WINTER NIGHT SETBACK TEMPERATURE 65 DEGREES F (ADJUSTABLE) SHALL BE MAINTAINED BY CYCLING THE AIR HANDLING UNIT AND OPENING D-5 TO MINIMUM POSITION, INITIATED BY THE SPACE THERMOSTAT WITH THE GREATEST HEATING NEED, UNTIL ALL SPACE THERMOSTATS ARE SATISFIED.
3. SUMMER NIGHT SETBACK TEMPERATURE 85 DEGREES F (ADJUSTABLE) SHALL BE MANITAINED BY CYCLING THE AIR HANDLING UNIT, OPENING V-1 AND OPENING D-5 TO MINIMUM POSITION, INITIATED BY THE SPACE THERMOSTAT WITH THE GREATEST COOLING NEED, UNTIL ALL SPACE THERMOSTATS ARE SATISFIED.

SMOKE DETECTORS:

1. WHEN SMOKE IS SENSED, BY EITHER SMOKE DETECTOR SD-1 OR SD-2, SA FAN STOPS, D-2 AND D-6 CLOSE. AHU SYSTEM SHALL RETURN TO NORMAL OPERATION WHEN SD-1 AND SD-2 ARE MANUALLY RESET

OUTDOOR AIR CONTROL:

1. AFM-60 SHALL MODLUALTE DAMPER D-1A TO MAINTAIN SCHEDULED MINIMUM AIRFLOW. DAMPER D-1 SHALL BE MODULATED AS PER OPTIMAL OUTDOOR AIR ENTHALPY REGIME TO PROVIDE AIRSIDE ECONOMIZER FUNCTION.
2. IF THE CARBON DIOXIDE DIFFERENTIAL BETWEEN ANY SPACE SENSOR CO-2 AND THE OUTDOOR AIR SENSOR CO-1 EXCEEDS 700 PPM THEN CO-1 OVERRIDES T-1 TO MODULATE DAMPER D-1 OPEN (BUT NOT MORE THAN MAX SETTING) UNTIL DIFFERENTIAL FALLS BELOW 700 PPM. IF CARBON DIOXIDE DIFFERENTIAL CONTINUES TO RISE ABOVE 700 PPM WITH D-1 AT MAXIMUM POSITION, THE BAS SHALL MODULATE D-1 OPEN UNTIL T-2 CAN NO LONGER MAINTAIN ITS SETPOINT. T-6 MODULATES VALVE V-3 TO MAINTAIN 75 DEGREES F SPACE TEMPERATURE.

VARIABLE AIR VOLUME AIR HANDLING UNIT 360-AH-6 SEQUENCE OF OPERATION

INPUT/OUTPUT SUMMARY

SYSTEM		INDICATION												ALARM				CONTROL					REMARKS
VARIABLE VOLUME AIR HANDLING UNIT	GRAPHIC	STATUS	TEMPERATURE	RELATIVE HUNIDITY	PPM	CFM	STATIC PRESSURE	DIFFERENTIAL PRESSURE	GPM	POSITION	RUN TIME	HERTZ	LOW	HIGH	CRITICAL	MAINTENANCE	PROGRAM START/STOP	HAND-OFF-AUTO	MODULATE	MIN/MAX	OPEN/CLOSED	
SYSTEM	X									X							X	X				HOA, BAS
SUPPLY AIR FAN		X				X	X				X	X	X	X	X		X					CS-1, AFM-6S, PD-1, PD-2, VSD-1, SPSS
OUTDOOR AIR			X		X	X																T-1, CO-1, AFM-60
RETURN AIR			X			X																T-5
SUPPLY AIR			X																			T-2
PHC LAT			X										X		X							T-3, T-4, F-1
SMOKE DETECTOR															X							SD-1, SD-2
EMERGENCY SHUTDOWN															X						X	ESS
FILTERS								X						X		X						DPS-1
CHILLED WATER FLOW													X			X						FS-1
COIL VALVES										X									X			V-1, V-2, V-3
DAMPERS										X									X			D-1, D-1A, D-3, D-5
DAMPERS										X											X	D-2, D-4, D-6, S-1, S-2, S-3
SPACE			X		X	X																T-6
PHC PUMP		X									X					X	X					CS-3, CO-2, V-2
EXHAUST AIR FAN		X														X						CS-4

VARIABLE AIR VOLUME AIR HANDLING UNIT 360-AH-6 INPUT/OUTPUT SUMMARY

Additions:	Date
Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 40828, Expiration Date: 07/15/2017

Approved:

Approved: Chief, Facilities and Engineering

Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

FULLY SPRINKLERED

Drawing Title: MECHANICAL AUTOMATIC TEMPERATURE CONTROLS

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360

Checked: EPH

Drawn: EPH

Location: PERRY POINT, MD

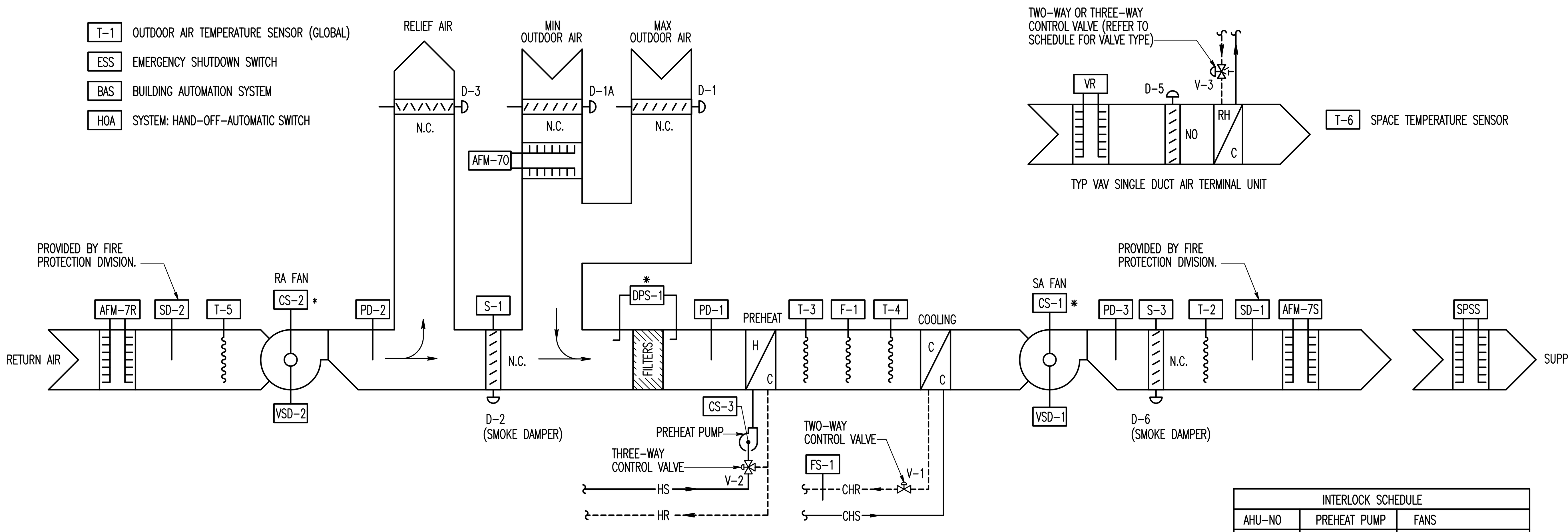
Date: 03/17/16

VA Project Number: 512-530

Drawing Number: M701

DEPARTMENT OF VETERANS AFFAIRS

NOTES:
1. DAMPERS D-2, D-3 AND D-6 SHALL BE PROVIDED BY AUTOMATIC TEMPERATURE CONTROLS CONTRACTOR.
2. DAMPERS D-1A AND D-1 ARE PROVIDED BY THE AHU MANUFACTURER.
3. DEVICES NOTED WITH ASTERISKS PROVIDE READ-OUT INFORMATION ONLY; NO CONTROL FUNCTION



INTERLOCK SCHEDULE		
AHU-NO	PREHEAT PUMP	FANS
360-AH-7	360-PHP-7	360-SF-7, 360-RF-7

AIR FLOW SCHEDULES		
	MAX CFM	MIN CFM
SA FAN	1,400	1,250
RA FAN	1,120	970
SA/RA DIFFERENTIAL	280	280

AIR FLOW MONITOR TYPES		
AHU-NO	RETURN AIR	SUPPLY AIR
360-AH-7	TYPE -	TYPE -

VARIABLE AIR VOLUME AIR HANDLING UNIT 360-AH-7 CONTROL DIAGRAM

INPUT/OUTPUT SUMMARY

SYSTEM		INDICATION											ALARM				CONTROL					REMARKS
VARIABLE VOLUME AIR HANDLING UNIT	GRAPHIC	STATUS	TEMPERATURE	RELATIVE HUNIDITY	PPM	CFM	STATIC PRESSURE	DIFFERENTIAL PRESSURE	GPM	POSITION	RUN TIME	HERTZ	LOW	HIGH	CRITICAL	MAINTENANCE	PROGRAM START/STOP	HAND-OFF-AUTO	MODULATE	MIN/MAX	OPEN/CLOSED	
SYSTEM	X									X							X	X				HOA, BAS
SUPPLY AIR FAN		X				X	X				X	X	X	X	X		X					CS-1, AFM-7S, PD-1, PD-3, VSD-1, SPSS
RETURN AIR FAN		X				X	X				X	X		X	X		X					CS-2, AFM-7R, PD-2, VSD-2,
OUTDOOR AIR			X			X																T-1, AFM-70
RETURN AIR			X																			T-5
SUPPLY AIR			X																			T-2
PHC LAT			X										X		X							T-3, T-4, F-1
SMOKE DETECTOR															X							SD-1, SD-2
EMERGENCY SHUTDOWN		X													X						X	ESS
FILTERS								X						X		X						DPS-1
CHILLED WATER FLOW													X			X						FS-1
COIL VALVES										X									X			V-1, V-2, V-3
DAMPERS										X									X			D-1, D-1A, D-3, D-5
DAMPERS										X											X	D-2, D-6, S-1, S-3
SPACE			X			X																T-6, V-2
PHC PUMP		X									X					X	X					CS-3

VARIABLE AIR VOLUME AIR HANDLING UNIT 360-AH-7 INPUT/OUTPUT SUMMARY

GENERAL:

1. THE AIR HANDLING SYSTEM SHALL BE STARTED AND STOPPED THROUGH A SYSTEM HAND-OFF-AUTOMATIC (HOA) SWITCH. WHEN INDEXED TO "HAND", THE SYSTEM SHALL BE ENERGIZED TO OPERATE UNDER THE CONTROL SEQUENCE. WHEN INDEXED TO "OFF", THE SYSTEM SHALL BE DE-ENERGIZED. WHEN INDEXED TO "AUTOMATIC", THE SYSTEM SHALL BE STARTED AND STOPPED THROUGH THE BUILDING AUTOMATION SYSTEM (BAS). THE H-O-A SWITCH POSITION SHALL BE MONITORED THROUGH THE BAS.
2. ALL SAFETIES AND ASSOCIATED CONTROL INTERLOCKS SHALL REMAIN ACTIVE IN ALL H-O-A SWITCH POSITIONS.
3. COORDINATE VARIABLE SPEED DRIVE (VSD) INTERFACE REQUIREMENTS WITH VSD MANUFACTURER.
4. PROVIDE A REMOTE EMERGENCY SHUTDOWN SWITCH (ESS) FOR SYSTEM SHUTDOWN. SWITCH SHALL BE INSTALLED AT A LOCATION APPROVED BY THE FIRE INSPECTOR. TYPICALLY INSTALL AT THE BUILDING ENTRANCE.
5. PREHEAT PUMP SHALL OPERATE CONTINUOUSLY WHENEVER OUTDOOR AIR (OA) TEMPERATURE AT T-1 IS BELOW 50 DEGREES F. FANS SHALL STOP IF PUMP FAILS TO OPERATE AS SENSED BY CURRENT SENSOR CS-3 AND SEND AN ALARM TO THE BAS.
6. LOW LIMIT STAT T-4 SHALL OVERRIDE PREHEAT COIL CONTROL LOOP TO OPEN PREHEAT VALVE V-2 WHEN PREHEAT DISCHARGE TEMPERATURE DROPS TO 40 DEGREES F.
7. ELECTRIC FREEZESTAT F-1 SHALL STOP SA AND RA FANS AT 35 DEGREES F AND SEND AN ALARM TO THE BAS.

STARTING AND STOPPING:

1. WHEN THE UNIT SUPPLY AIR FAN IS ENERGIZED TO OPERATE, THE RETURN AIR FAN SHALL BE INTERLOCKED TO OPERATE, UNLESS OTHERWISE NOTED. AIR HANDLING UNIT SUPPLY AND RETURN AIR FANS SHALL BE SOFT STARTED THROUGH THEIR ASSOCIATED VARIABLE SPEED DRIVE.
2. WHEN SYSTEM OPERATION IS STARTED BY THE H-O-A SWITCH OR BAS, D-2 OPENS. WHEN D-2 AND D-6 ARE OPEN, END SWITCHES S-1 AND S-3 START RESPECTIVE SA AND RA FANS. LOCK OUT RELAY ACTUATED BY FAN STARTER PREVENTS END SWITCHES FROM STOPPING FANS.
3. PRESSURE SWITCH PD-1 STOPS SA FAN SHOULD MIXING PLENUM PRESSURE FALL BELOW MINUS 2"WG.
4. PRESSURE SWITCH PD-2 STOPS RA FAN SHOULD RELIEF DUCT PRESSURE RISE ABOVE 2"WG.
5. PRESSURE SWITCH PD-3 STOPS SA FAN SHOULD SUPPPLY DUCT PRESSURE RISE ABOVE 2"WG.
6. WHENEVER FANS ARE STOPPED D-1A, D-1 AND D-3 CLOSE, AND AFTER 2 MINUTES DELAY (ADJUSTABLE 0-5 MINUTES), D-2 AND D-6 CLOSE.

PREPARATORY SPACE (0600 TO 0730)/(ADJUSTABLE):

1. AHU STARTS. SA AND RA FANS ON. D-1A, D-1, D-3 ARE CLOSED, D-2 AND D-6 ARE OPEN.
2. WARM-UP: WHEN RETURN AIR TEMPERATURE AT T-5 IS BELOW 72 DEGREES F, T-5 SHALL RESET T-2 TO 70 DEGREES F AND AIR TERMINAL UNIT DAMPER D-5 AND HEATING COIL VALVE V-3 SHALL FULLY OPEN UNTIL TEMPERATURE AT T-6 REACHES 72 DEGREES F (ADJUSTABLE) AT WHICH POINT T-6 SHALL MODULATE D-5 AND V-3 TO MAINTAIN SPACE TEMPERATURE.
3. PULL-DOWN: WHEN RETURN AIR TEMPERATURE AT T-5 IS ABOVE 75 DEGREES F, T-2 SHALL MODULATE VALVE V-1 TO MAINTAIN 55 DEGREES F. AIR TERMINAL UNIT DAMPER D-5 AND HEATING COIL VALVE V-3 SHALL MODULATE IN SEQUENCE TO MAINTAIN SPACE TEMPERATURE. WHEN TEMPERATURE AT T-5 REACHES 75 DEGREES F (ADJUSTABLE) THE AHU SHALL OPERATE IN THE OCCUPIED MODE.

OCCUPIED SPACE (0730 TO 1800)/(ADJUSTABLE):

1. SA AND RA FANS ON.
2. WHEN OA AT T-1 IS BELOW 60 DEGREES F (ADJUSTABLE), T-3 MODULATES D-1A, D-1, D-2, D-3 AND V-2 AND T-2 MODULATES V-1, ALL IN SEQUENCE ON TEMPERATURE RISE TO MAINTAIN 54 DEGREES F (ADJUSTABLE).
3. WHEN OA AT T-1 IS ABOVE 65 DEGREES F (ADJUSTABLE) T-1 OPENS D-1A AS DESCRIBED UNDER "OUTDOOR AIR CONTROL" AND OPENS D-3 TO CORRESPONDING MINIMUM POSITION AND T-2 MODULATES V-1 TO MAINTAIN 55 DEGREES F (ADJUSTABLE). FLOW SWITCH FS-1 SHALL SEND AN ALARM TO THE BAS IF NO FLOW IS SENSED.

FAN CAPACITY CONTROL:

1. STATIC PRESSURE SENSING STATION SPSS SHALL MODULATE THE SUPPLY AIR FAN SPEED THROUGH THE ASSOCIATED VARIABLE SPEED DRIVE VSD-1. THE AIR FLOW MEASURING STATIONS AFM-7S SHALL RESET AIR FLOW MEASURING STATION AFM-7R. AFM-7R SHALL MODULATE THE RETURN AIR FAN SPEED THROUGH ASSOCIATED VARIABLE SPEED DRIVE VSD-2 ACCORDING TO THE INDICATED SCHEDULE.
2. THE BAS SHALL POLE THE POSITION OF ALL D-5 DAMPERS AND RESET SPSS SETPOINT UNTIL ONE D-5 DAMPER IS OPEN TO 90 PERCENT OF FULL AIR FLOW.

UNOCCUPIED SPACE (1800 TO 600)/(ADJUSTABLE):

1. SA AND RA FANS OFF. D-1A, D-1, D-2, D-3, AND D-6 ARE CLOSED. COOLING COIL VALVE V-1 SHALL BE CLOSED. HEATING COIL VALVE V-2 SHALL BE OPEN TO COIL WHEN OA TEMPERATURE IS BELOW 50 DEGREES F AND CLOSED TO COIL WHEN OA TEMPERATURE IS ABOVE 55 DEGREES F.
2. WINTER NIGHT SETBACK TEMPERATURE 65 DEGREES F (ADJUSTABLE) SHALL BE MAINTAINED BY CYCLING THE AIR HANDLING UNIT AND OPENING D-5 TO MINIMUM POSITION, INITIATED BY THE SPACE THERMOSTAT WITH THE GREATEST HEATING NEED, UNTIL ALL SPACE THERMOSTATS ARE SATISFIED.
3. SUMMER NIGHT SETBACK TEMPERATURE 85 DEGREES F (ADJUSTABLE) SHALL BE MANITAINED BY CYCLING THE AIR HANDLING UNIT, OPENING V-1 AND OPENING D-5 TO MINIMUM POSITION, INITIATED BY THE SPACE THERMOSTAT WITH THE GREATEST COOLING NEED, UNTIL ALL SPACE THERMOSTATS ARE SATISFIED.

SMOKE DETECTORS:

1. WHEN SMOKE IS SENSED, BY EITHER SMOKE DETECTOR SD-1 OR SD-2, SA AND RA FANS STOP AND D-2 AND D-6 CLOSE. AHU SYSTEM SHALL RETURN TO NORMAL OPERATION WHEN SD-1 AND SD-2 ARE MANUALLY RESET

OUTDOOR AIR CONTROL:

1. AFM-70 SHALL MODLUALTE DAMPER D-1A TO MAINTAIN SCHEDULED MINIMUM AIRFLOW. DAMPER D-1 SHALL BE MODULATED AS PER OPTIMAL OUTDOOR AIR ENTHALPY REGIME TO PROVIDE AIRSIDE ECONOMIZER FUNCTION.

VARIABLE AIR VOLUME AIR HANDLING UNIT 360-AH-7 SEQUENCE OF OPERATION

FULLY SPRINKLERED

Additions:	Date
Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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STATE OF MARYLAND ... PROFESSIONAL ENGINEER
3/17/2016

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Drawing Title: MECHANICAL AUTOMATIC TEMPERATURE CONTROLS

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360

Checked: EPH

Drawn: EPH

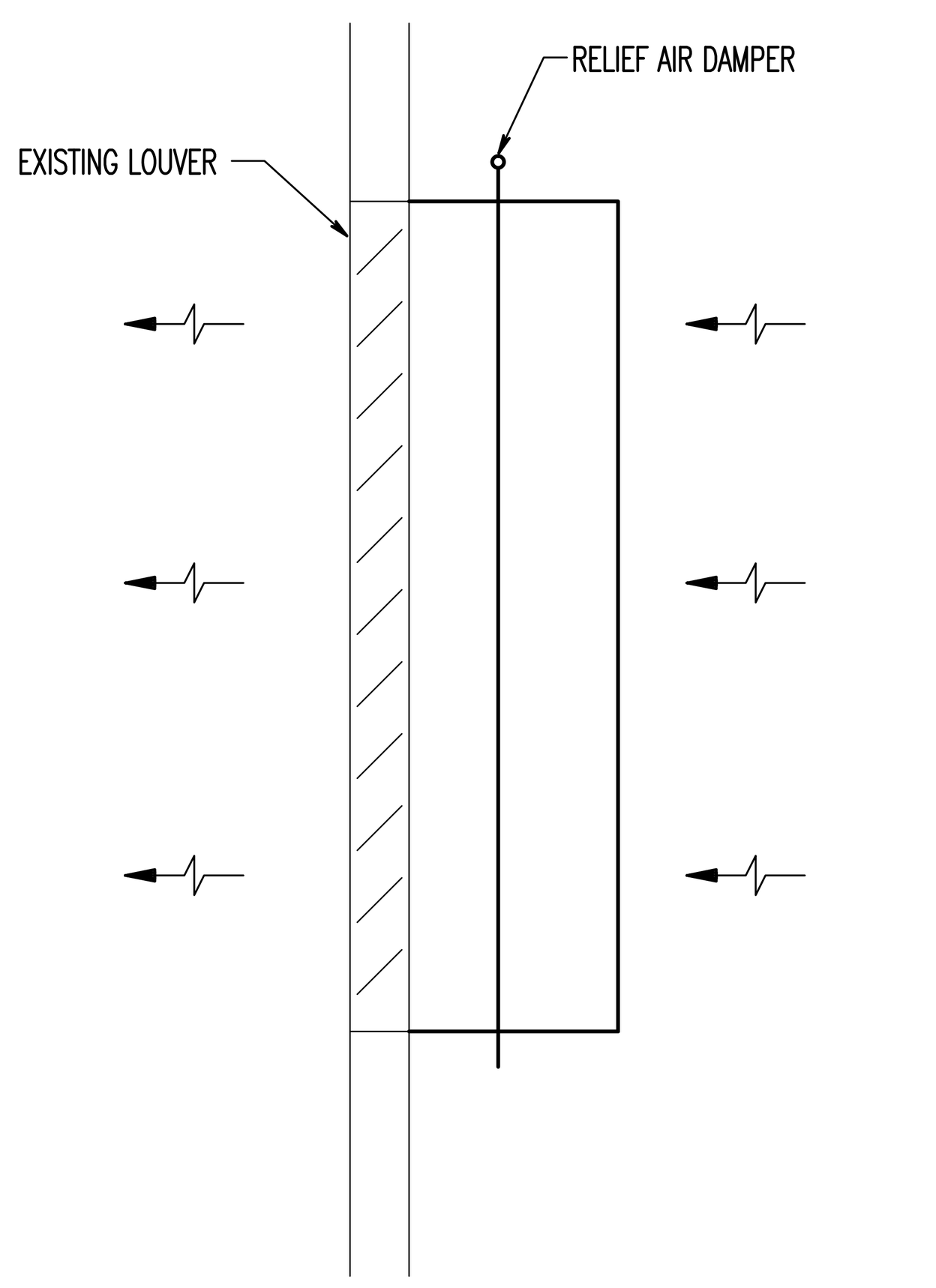
Location: PERRY POINT, MD

Date: 03/17/16

VA Project Number: 512-530

Drawing Number: M702

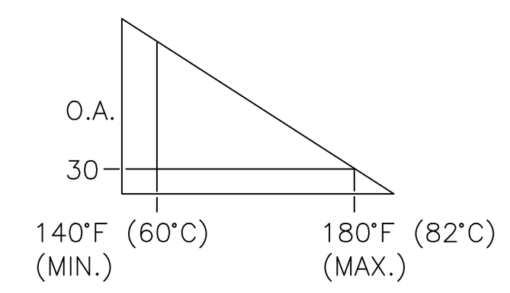
DEPARTMENT OF VETERANS AFFAIRS



RELIEF AIR DAMPER

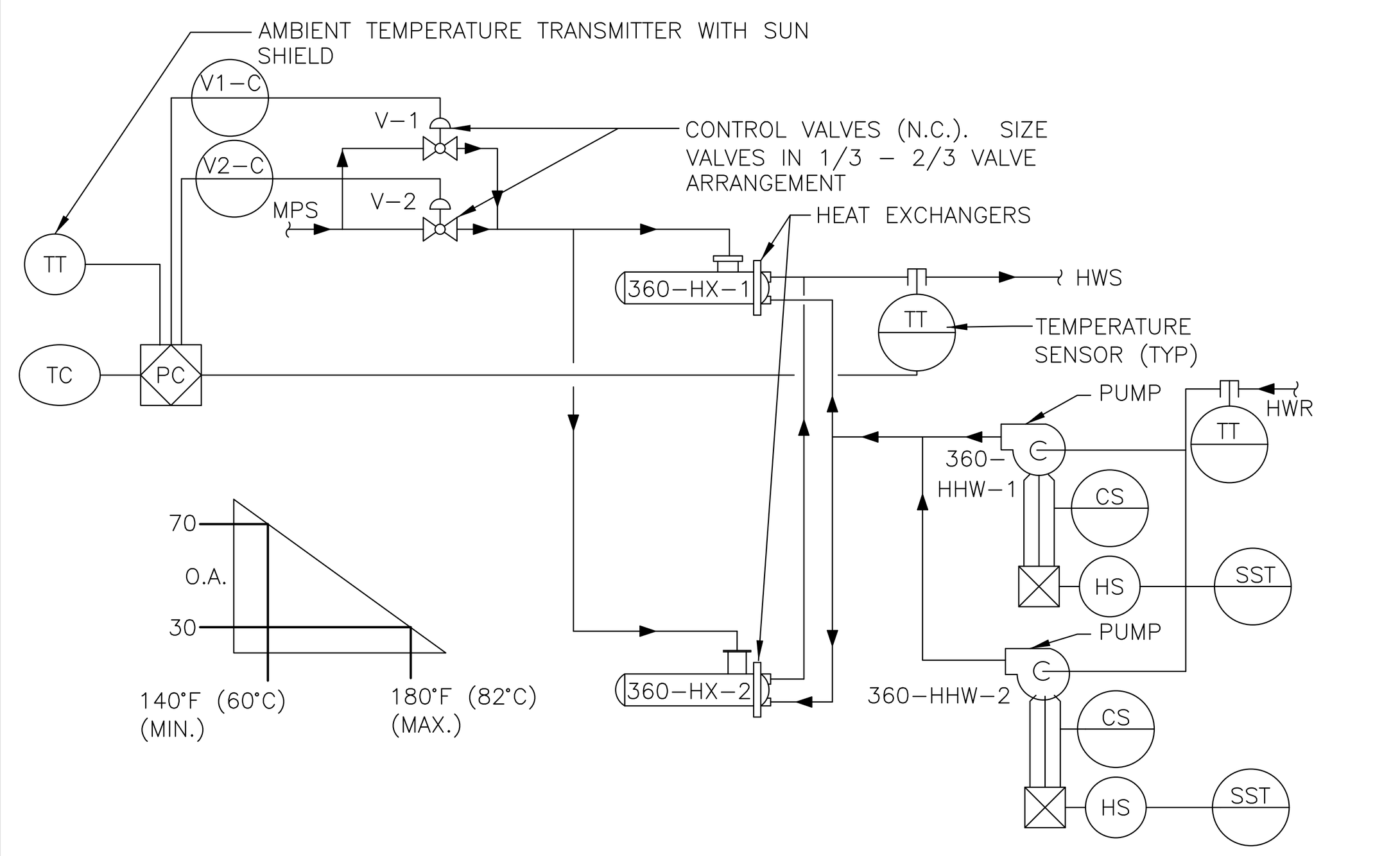
1. DAMPER SHALL FULLY OPEN UPON 360-AH-4, 5 OR 7 ENTERING OUTDOOR ECONOMIZER MODE.
2. DAMPER SHALL REMAIN CLOSED IF BOTH 360-AH-4, 5 OR 7 ARE INDEXED TO NORMAL OPERATING MODE AND OUTDOOR AIR VOLUME.

SEQUENCE OF OPERATION:
1. STEAM CONTROL VALVE SHALL MODULATE TO MAINTAIN THE LEAVING HOT WATER TEMPERATURE AT SET POINT.
2. THE LEAVING HOT WATER TEMPERATURE SHALL BE RESET INVERSELY WITH THE OUTDOOR TEMPERATURE AS SCHEDULED.
3. THE LEAD AND LAG PUMPS AND HEAT EXCHANGERS SHALL BE SEQUENTIAL BY THE OPERATOR CONTROLS AT THE PRE-DETERMINED INTERVAL (USUALLY 7 DAYS). IN THE EVENT THE PUMP FAILS TO START WITHIN 30 SECONDS, AN ALARM SHALL BE INITIATED AND THE SECOND PUMP SHALL START AUTOMATICALLY.



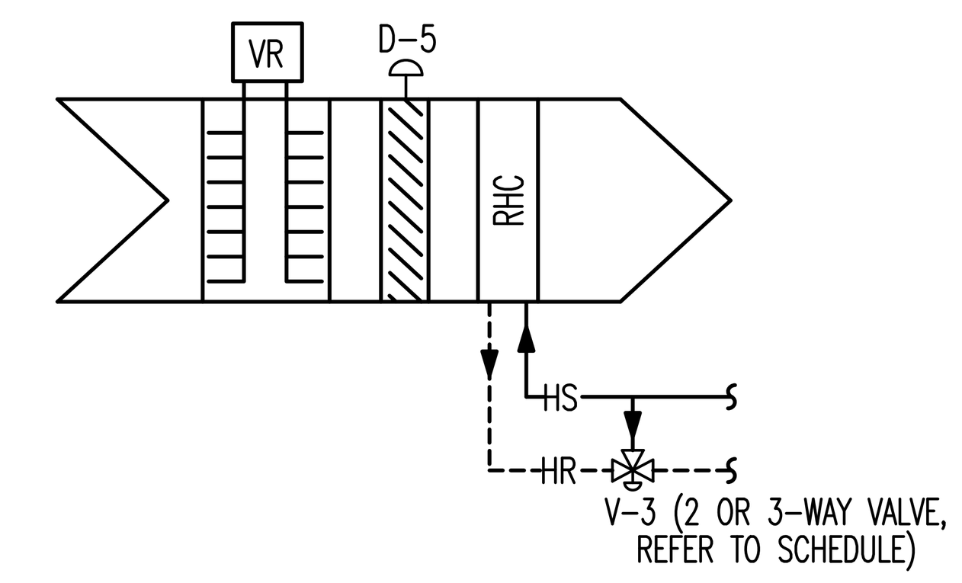
TYP OSA RESET SCHEDULE

VALVE SEQUENCE:
1. V1 (1/3 CAPACITY) MODULATING FULLY OPEN TO MAINTAIN SET POINT
2 .V2 (2/3 CAPACITY) MODULATE FULLY OPEN TO MAINTAIN SET POINT.
3. BOTH V1 & V2 MODULATE TOGETHER TO MAINTAIN SET POINT.



DUAL HEAT EXCHANGER CONTROLS (HEATING SYSTEM)

BAS	BUILDING AUTOMATION SYSTEM
T-6	SPACE TEMPERATURE SENSOR



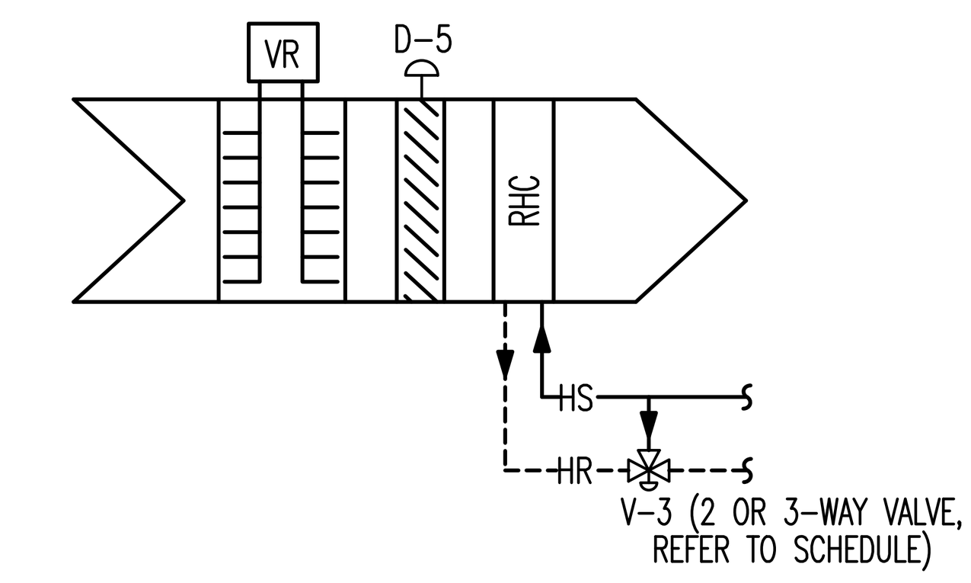
CONSTANT AIR VOLUME TERMINAL UNIT WITH HOT WATER REHEAT

1. SUPPLY AIR DAMPER, D-5, SHALL MAINTAIN AIRFLOW SETTING THROUGH VOLUME REGULATOR VR.
2. ON A FALL IN SPACE TEMPERATURE, TEMPERATURE SENSOR, T-6, SHALL MODULATE VALVE, V-3, TO MAINTAIN 75 DEGREES F SPACE TEMPERATURE (ADJUSTABLE).

INPUT/OUTPUT SUMMARY

SYSTEM		INDICATION											ALARM				CONTROL					
CONSTANT VOLUME TRU	GRAPHIC	STATUS	TEMPERATURE	RELATIVE HUMIDITY	PPM	CFM	STATIC PRESSURE	DIFFERENTIAL PRESSURE	GPM	POSITION	RUN TIME	HERTZ	LOW	HIGH	CRITICAL	MAINTENANCE	PROGRAM START/STOP	HAND-OFF-AUTO	MODULATE	MIN/MAX	OPEN/CLOSED	REMARKS
SYSTEM	X																					BAS
SUPPLY AIR						X																VR
DAMPER										X									X			D-5
SPACE			X										X	X								T-6
VALVE										X					X				X			V-3

BAS	BUILDING AUTOMATION SYSTEM
T-6	SPACE TEMPERATURE SENSOR

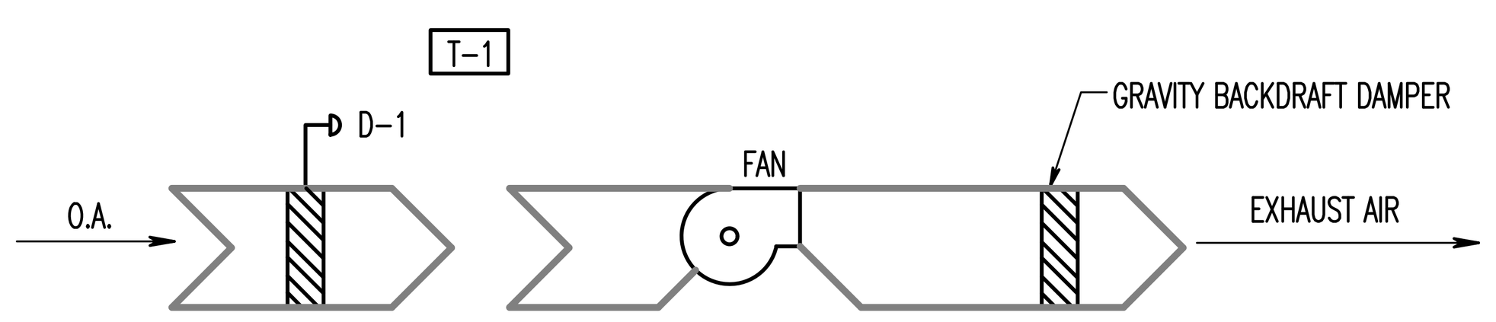


VARIABLE AIR VOLUME TERMINAL UNIT WITH HOT WATER REHEAT

1. SPACE TEMPERATURE SENSOR, T-6, SHALL MODULATE DAMPER, D-5, THROUGH VOLUME REGULATOR, VR, FROM MAXIMUM AIRFLOW SETTING TO MINIMUM AIRFLOW SETTING, TO MAINTAIN 75 DEGREES F SPACE TEMPERATURE (ADJUSTABLE).
2. ON A FURTHER FALL IN SPACE TEMPERATURE, T-6, SHALL MODULATE VALVE, V-3, TO MAINTAIN 75 DEGREES F SPACE TEMPERATURE (ADJUSTABLE). D-6 IS AT MINIMUM SETPOINT.

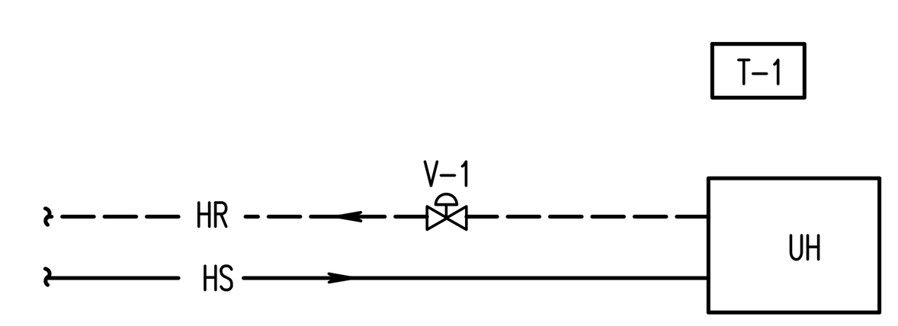
INPUT/OUTPUT SUMMARY

SYSTEM		INDICATION											ALARM				CONTROL					
VARIABLE VOLUME TRU	GRAPHIC	STATUS	TEMPERATURE	RELATIVE HUMIDITY	PPM	CFM	STATIC PRESSURE	DIFFERENTIAL PRESSURE	GPM	POSITION	RUN TIME	HERTZ	LOW	HIGH	CRITICAL	MAINTENANCE	PROGRAM START/STOP	HAND-OFF-AUTO	MODULATE	MIN/MAX	OPEN/CLOSED	REMARKS
SYSTEM	X																					BAS
SUPPLY AIR						X																VR
DAMPER										X									X			D-5
SPACE			X										X	X								T-6
VALVE										X					X				X			V-3



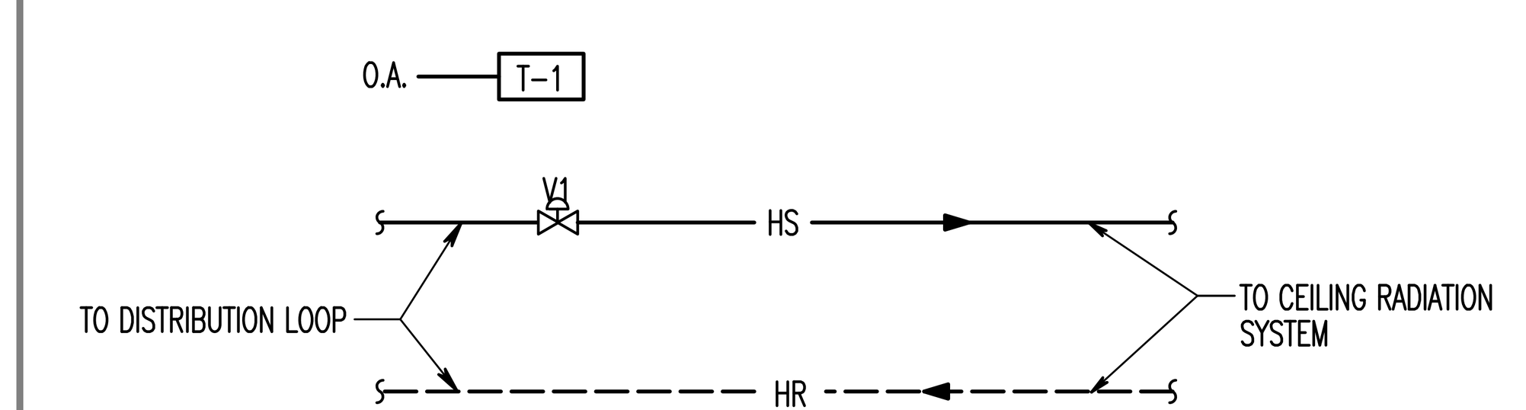
EQUIPMENT ROOM VENTILATION

1. SPACE TEMPERATURE SENSOR T-1 OPENS D-1 AND STARTS EXHAUST FAN WHEN TEMPERATURE RISES TO 85 DEGREES F.
2. FAN STOPS, D-1 CLOSES WHEN TEMPERATURE FALLS TO 75 DEGREES F.
3. CONTROLS TYPICAL FOR FAN 360-EF-MECH.
4. D-1 MOUNTED AS SHOWN ON DRAWINGS.
5. GRAVITY BACKDRAFT DAMPER PROVIDED BY FAN MANUFACTURER.



UNIT HEATER

1. ROOMSTAT T-1 MODULATES VALVE V-1 TO MAINTAIN 60 DEGREES F.
2. FAN SHALL ACTIVATE UPON A CALL FOR HEATING AND CONTINUE OPERATING FOR FIVE MINUTES UPON CLOSING OF VALVE V-1.
3. CABINET TYPE HEATERS SHALL HAVE RETURN STAT IN LIEU OF ROOM STAT. CONTROL SEQUENCE IDENTICAL WITH ROOM SETPOINT AT 70 DEGREES F.



CEILING PLENUM RADIATION SYSTEM

1. WHEN OA AT T-1 IS BELOW 38 DEGREES F, V-1 OPENS FULLY.
2. V-1 CLOSES WHEN OA AT T-1 RISES ABOVE 45 DEGREES F.

Additions:	Date
Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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DEPARTMENT OF VETERANS AFFAIRS

AIR DEVICES

DESIG	PANEL SIZE	SLOTS	BASIS OF DESIGN
S-1	24x24	–	TITUS TDC
S-2	SEE PLAN	2x1"	TITUS TBD30
S-3	24"ø	–	TITUS TMRA
S-4	SEE PLAN	–	TITUS DL-SV
R-1	SEE PLAN	–	TITUS 350RL
R-2	24x24	–	TITUS 350 FLF2 (3)

NOTES FOR AIR DEVICES:

1. SEE DRAWINGS WHERE INDICATED. SEE DRAWINGS FOR NECK SIZES AND AIRFLOW.
2. SEE SPECIFICATIONS FOR OPTIONAL ACCESSORIES.
3. PROVIDE MERV 3 FILTERS.

AIR HANDLING UNITS

UNIT NO	TYPE	LOCATION	CFM MIN OA	CFM MAX RA	CFM MAX SA	FILTER TYPE PRE	FILTER TYPE FINAL	ASSOCIATED FANS SUPPLY DESIG	SUPPLY ESP	RETURN DESIG	HOT WATER HYDRONIC PREHEAT COIL: COIL NO	SERVICE	AIR FLOW CFM	FV (MAX)	APD (MAX)	EAT	LAT	MBH	CIRCULATING FLUID: FLUID	GPM	EFT	LFT	FPD	CHILLED WATER COOLING COIL: COIL NO	SERVICE	AIR FLOW CFM	FV (MAX)	APD (MAX)	EAT DB	EAT WB	LAT DB	LAT WB	MBH TOTAL	MBH SENS	CIRCULATING FLUID: FLUID	GPM	EFT	LFT	FPD (MAX)	NOTES
360-AH-4	A	W MEZZANINE	1,650	9,350	11,000	MERV 8	MERV 13	360-SF-4	1.5	360-RF-4	PHC-4	PRE-HEAT	11,000	500	0.3	49	95	450	H20	20	180	140	15 FT	CC-4	COOLING	11,000	500	1.0	78	65	52.9	52.2	418	302	H20	69	42	54	20 FT	1,2,4,5
360-AH-5	A	W MEZZANINE	1,650	9,350	11,000	MERV 8	MERV 13	360-SF-5	1.0	360-RF-5	PHC-5	PRE-HEAT	11,000	500	0.3	49	95	400	H20	20	180	140	15 FT	CC-5	COOLING	11,000	500	1.0	78	65	52.8	52.3	418	302	H20	69	42	54	20 FT	1,2,4,5
360-AH-6	B	NORTH ROOF	880	3,520	4,400	MERV 8	MERV 13	360-SF-6	2.5	–	PHC-6	PRE-HEAT	4,400	500	0.3	47	55	40	H20	2	180	140	15 FT	CC-6	COOLING	4,400	500	1.0	80.2	67	52.7	52.3	181	127	H20	30	42	54	20 FT	1,2,3,4,5
360-AH-7	A	W MEZZANINE	280	1,120	1,400	MERV 8	MERV 13	360-SF-7	1.5	360-RF-7	PHC-7	PRE-HEAT	1,400	500	0.3	50	55	20	H20	1	180	140	15 FT	CC-7	COOLING	1,400	500	1.0	80.2	67	52.7	52.2	58	41	H20	10	42	54	20 FT	1,2,4,5

NOTES FOR AIR HANDLING UNITS:

1. PROVIDE ENTHALPY CONTROLLED AIRSIDE ECONOMIZER FUNCTION WITH MINIMUM AND MAXIMUM DAMPER INTEGRAL TO THE UNIT. PROVIDE INTEGRAL AIRFLOW MEASURING STATION FOR MINIMUM OUTSIDE AIR DAMPER.
2. UNIT SHALL CONSIST OF MIXING SECTION, FILTERS, ACCESS SECTION, PRE-HEATING COIL, ACCESS SECTION, COOLING COIL, FAN, AND DISCHARGE SECTION. PROVIDE ASSOCIATED FANS OR FAN ARRAYS WITH VARIABLE FREQUENCY DRIVES.
3. UNIT SHALL INCLUDE OUTDOOR AIR CO-2 MONITORING SENSOR FOR OUTDOOR AIR DEMAND VENTILTION CONTROL.
4. COIL SIZE IS DETERMINED BY AIR HANDLING UNIT SIZE.
5. MAXIMUM 11 FINS PER INCH.

AIR SEPARATOR SCHEDULE

UNIT NO	LOCATION	SYSTEM AND/OR SERVICE	AIR SEPARATOR SIZE IN	GPM	MAX WPD (FT)	BUILT-IN STRAINER REQUIRED	NOTES
360-AS-HW	MECH ROOM	HEATING HOT WATER	3	95	2	NO	1

NOTES FOR AIR SEPARATOR SCHEDULE:

1. BASIS OF DESIGN IS TACO 4900 SERIES WITH REMOVABLE COVER AND AIR/DIRT SEPARATOR. AIR SEPARATOR IS PROVIDED AS PART OF PACKAGED STEAM CONVERTOR, PUMP AND AIR SEPARATOR PACKAGE.

EXISTING AIR HANDLING UNITS REBALANCE SCHEDULE

UNIT NO	LOCATION	CFM MIN OA	CFM MAX RA	CFM MAX SA	ASSOCIATED FANS SUPPLY DESIG	SUPPLY ESP	RETURN DESIG	HOT WATER HYDRONIC PREHEAT COIL: COIL NO	SERVICE	AIR FLOW CFM	EAT	LAT	MBH	CIRCULATING FLUID GPM	EFT	LFT	FPD (MAX)	CHILLED WATER COOLING COIL: COIL NO	SERVICE	AIR FLOW CFM	EAT DB	EAT WB	LAT DB	LAT WB	MBH TOTAL	MBH SENS	CIRCULATING FLUID: FLUID	GPM	EFT	LFT	FPD (MAX)
360-AH-2	W MEZZANINE	570	5,060	5,630	360-SF-2	0.7	360-RF-2	360-HC2	HEATING	5,630	63	80	103.4	5.0	180	140	1 FT	360-CC2	COOLING	5,630	76.5	61.9	52.9	51.4	143.5	126.1	H20	29	42	52	6 FT
360-AH-3	W MEZZANINE	290	1,130	1,420	360-SF-3	1.6	–	360-HC3	HEATING	1,420	57	80	35.2	1.8	180	140	1 FT	360-CC3	COOLING	1,420	78.6	65.2	52.7	52.4	54.6	41.5	H20	12.5	42	52	3 FT

DIAPHRAGM EXPANSION TANKS

UNIT NO	LOCATION	SERVICE	APPROX SIZE (DxH)	PRV (PSIG)	ACCEPTANCE VOLUME	INITIAL CHARGE (PSIG)	NOTES
360-ET-HW	MECH ROOM	HEATING HOT WATER	20x39	100	12	12 PSI	1
360-ET-CW	MECH ROOM	CHILLED WATER	14x15	100	2.5	12 PSI	2

NOTES FOR DIAPHRAGM EXPANSION TANKS:

1. VERTICAL FLOOR MOUNTED. PROVIDED AS PART OF PACKAGED STEAM CONVERTOR, PUMP, AND AIR SEPARATOR PACKAGE.
2. VERTICALLY SUSPENDED. BASED ON TACO CBX-15-125

BY-PASS WATER FILTER

UNIT NO	LOCATION	PIPE SIZE	FILTER GPM	BASIS OF DESIGN
BWF-1	EX MECH RM	1-1/2	16	LAKOS EHTX

PUMPS

UNIT NO	TYPE	LOCATION	SERVICE	MOTOR TYPE	FLUID	GPM	TOTAL FPD	TEMP	MOTOR HP (W)	MOTOR V/PH/HZ	RPM	NOTES
360-P-HHW	A	MECH ROOM	HHW	ODP	WATER	160	50	140	5	460/3/60	1670	1, 2
360-PHP-4	B	360-AH-4	PRE-HEAT COIL	ECM	WATER	20	15	180	(370)	115/1/60	–	3
360-PHP-5	B	360-AH-5	PRE-HEAT COIL	ECM	WATER	20	15	180	(370)	115/1/60	–	3
360-PHP-6	B	CEILING BELOW AH-6	PRE-HEAT COIL	ECM	WATER	2	15	180	(117)	115/1/60	–	4
360-PHP-7	B	360-AH-7	PRE-HEAT COIL	ECM	WATER	1	15	180	(117)	115/1/60	–	4
360-P-CHW	A	MECH ROOM	CHILLED WATER	ODP	WATER	300	40	42	5	460/3/60	1217	5

NOTES FOR PUMPS:

1. DUTY INDICATED IS FOR EACH PUMP OF A DUAL ARM PUMP SET. BASIS OF DESIGN IS ARMSTRONG SERIES DESIGN ENVELOPE SENSORLESS 4302.
2. PROVIDE PUMPS AS PART OF PACKAGED STEAM TO HOT WATER CONDENSER SKID.
3. BASIS OF DESIGN IS ARMSTRONG ASTRO 2 SIZE 286.
4. BASIS OF DESIGN IS ARMSTRONG ASTRO 2 SIZE 250.
5. DUTY INDICATED IS FOR EACH PUMP OF A DUAL ARM PUMP SET. BASIS OF DESIGN IS ARMSTRONG DUAL-ARM MODEL 4382.
6. CONDENSATE PUMPS ARE PRESSURE OPERATED WITH A MOTIVE FORCE OF 30PSIG AND A TOTAL BACK PRESSURE OF 15PSIG. DUTY IS INDICATED FOR EACH PUMP IN A TWO PUMP SET. BASIS OF DESIGN IS CEMLINE V25CCP-3x2-D-65.
7. CONDENSATE PUMPS ARE PROVIDED AS PART OF A PACKAGED SKID-MOUNTED CONDENSATE RESERVOIR AND DUAL-PUMP SYSTEM. RESERVOIR SHALL BE MINIMUM 65 GALLONS AND ASME RATED AT 200 PSIG WITH INTAKE AND VENT CONNECTIONS.

SINGLE DUCT AIR TERMINAL UNITS

UNIT NO	TYPE	MAX CFM	MIN CFM	BRANCH DUCT SIZE (2)	HEATING EAT	LAT	BRANCH PIPE SIZE	HOT WATER MBH (3)	GPM	WPD	NOTES
VAV-9	VAV	530	300	10	55	95	3/4	13	1.0	10.0	5
VAV-10	CV	150	150	6	55	95	3/4	6.5	0.5	10.0	5
VAV-11	CV	260	260	8	55	95	3/4	11.3	1.0	10.0	5
VAV-12	CV	125	125	6	55	95	3/4	5.4	0.5	10.0	5
VAV-13	VAV	460	350	10	55	95	3/4	15.1	1.5	10.0	5
VAV-14	VAV	1370	930	14	55	95	3/4	40.3	4.0	10.0	4, 5
VAV-15	CV	960	960	12	55	95	3/4	41.6	4.0	10.0	5
VAV-16	CV	950	950	12	55	95	3/4	41.2	4.0	10.0	5
VAV-17	CV	500	500	10	55	95	3/4	21.7	2.0	10.0	4
VAV-18	VAV	1020	560	12	55	95	3/4	24.3	2.5	10.0	
VAV-19	VAV	1020	560	12	55	95	3/4	24.3	2.5	10.0	
VAV-20	CV	845	845	12	55	95	3/4	36.7	3.5	10.0	
VAV-21	CV	505	505	10	55	95	3/4	21.9	2.0	10.0	
VAV-22	CV	150	150	6	55	95	3/4	6.5	0.5	10.0	
VAV-23	VAV	310	160	8	55	95	3/4	6.9	0.5	10.0	4
VAV-24	CAV	230	130	8	55	95	3/4	5.6	0.5	10.0	
VAV-25	CV	430	430	10	55	95	3/4	18.7	2.0	10.0	
VAV-26	CV	200	200	8	55	95	3/4	8.7	1.0	10.0	

NOTES FOR SINGLE DUCT AIR TERMINAL UNITS:

1. HEATING WATER: 180 F EWT, 160-DEG F LWT
2. BRANCH DUCT SIZE IS RUNOUT SIZE AND NOT NECESSARILY THE BOX INLET SIZE. PROVIDE 1 FT. OF STRAIGHT DUCT ON BOX INLET, SAME SIZE AS BOX INLET. PROVIDE INSULATED TRANSITION IF REQUIRED FOR CONNECTION.
3. HEATING CAPACITY (MBH) IS BASED ON FLOW AT MINIMUM CFM.
4. PROVIDE WITH 3-WAY REHEAT CONTROL VALVE.
5. EXISTING TERMINAL UNIT TO BE REBALANCED TO VALUES INDICATED IN SCHEDULE.

PRESSURE POWERED PUMPS

UNIT NO	TYPE	LOCATION	SERVICE	MOTOR TYPE	FLUID	GPM	TOTAL FPD	TEMP	NOTES
360-P-COND	A	MECH ROOM	CONDENSATE	PRESSURE	CONDENSATE	5	35	212	1,2

NOTES FOR PUMPS:

1. CONDENSATE PUMPS ARE STEAM PRESSURE OPERATED WITH A MOTIVE FORCE OF 30 PSIG AND A TOTAL BACK PRESSURE OF 15 PSIG. DUTY IS INDICATED FOR EACH PUMP IN A TWO PUMP SET. BASIS OF DESIGN IS CEMLINE V25CCP-3x2-D-65.
2. CONDENSATE PUMPS ARE PROVIDED AS PART OF A PACKAGED SKID-MOUNTED CONDENSATE RESERVOIR AND DUAL-PUMP SYSTEM. RESERVOIR SHALL BE MINIMUM 65 GALLONS AND ASME RATED AT 200 PSIG WITH INTAKE AND VENT CONNECTIONS.

STEAM PRESSURE REDUCING VALVES

UNIT NO	LOCATION	PRESSURE, PSIG INLET	PRESSURE, PSIG REDUCED	CAPACITY LB/HR	PIPE SIZES (1) A	B	C	D	E	F	NOTES
360-PRV-1	MECH ROOM	105	30	1,000	2-1/2"	1-1/2"	2"	1-1/2"	3"	1-1/2"	1
360-PRV-2	MECH ROOM	105	30	1,870	2-1/2"	2"	2-1/2"	1-1/2"	3"	1-1/2"	1

NOTES FOR STEAM PRESSURE REDUCING VALVES:

1. PROVIDE SINGLE STAGE STEAM PRV. BASIS OF DESIGN IS HOFFMAN SPECIALTIES PARALLEL FLOW 3/4", 1-1/4" PRVS WITH PRESSURE PILOT CONTROL. PIPE SIZING IS KEYED TO PRV PIPING DIAGRAM

EXISTING FAN REBALANCE SCHEDULE

UNIT NO	LOCATION	SERVICE	DRIVE	CFM ORIG	CFM NEW	NOMINAL WHEEL DIA	TSP ORIG	TSP NEW	BHP ORIG	BHP NEW	MOTOR HP	RPM ORIG	RPM NEW	MOTOR V/PH/HZ	NOTES
360-SF-2	360-AH-2	SUPPLY AIR	BELT	7,500	5,630	15	1.6	0.7	13.0	3.5	15	2595	1947	460/3/60	
360-SF-3	360-AH-3	SUPPLY AIR	BELT	1,300	1,420	9	1.3	1.6	1.1	1.4	1-1/2	1710	1868	460/3/60	
360-RF-2	360-AH-2	RETURN AIR	BELT	7,500	5,060	24	0.5	0.2	2.5	0.8	3	862	582	460/3/60	
360-EF3	NORTH ROOF	EXHAUST	BELT	1,030	800	9	0.35	0.2	–	–	1/3	1589	1234	460/3/60	1
360-EF4	EAST MEZZANINE	EXHAUST	BELT	200	150	10	0.25	0.1	–	–	1/4	1007	755	460/3/60	1
360-EF5	WEST ROOF	EXHAUST	BELT	515	640	8	0.2	0.3	–	–	1/6	1193	1483	460/3/60	1

NOTES FOR REBALANCED FANS:

1. CONTRACTOR SHALL ADJUST SHEAVE PACKAGE OR PROVIDE NEW SHEAVE PACKAGE TO ACHEIVE SCHEDULED AIRFLOWS. TEST FAN TO ENSURE PROPER PERFORMANCE ONCE ADJUSTMENTS ARE MADE.

FLUID-TO-FLUID HEAT EXCHANGERS

UNIT NO	LOCATION	TYPE	SERVICE	PRIMARY FLUID FLUID	GPM	EFT	LFT	FPD (PSI)	SECONDARY FLUID FLUID	GPM	EFT	LFT	FPD (PSI)	NOTES
360-HX-2	MECH ROOM	–	DOMESTIC HOT WATER	HOT WATER	13	180	140	5	DOM WATER	5	40	140	2	1, 2

NOTES FOR FLUID-TO-FLUID HEAT EXCHANGERS:

1. PROVIDE DOUBLE WALL PLATE AND FRAME HEAT EXCHANGER. BASIS OF DESIGN IS ALFA LAVAL TL3BD-FG.

UNIT HEATERS

UNIT NO	TYPE	LOCATION	APPROX UNIT SIZE W	H	D	NOM CFM	CAPACITY MBH	EAT	HOT WATER (1) GPM	WPD (MAX)	FAN MOTOR HP (W)	PIPE SIZE	NOTES
UH-1	UHP	LOADING DOCK 30	26	26	10	1295	83.7	55	8.5	5	1/6	1-1/2	2
UH-2	UHP	DOCK EQUIPMENT 34	26	26	10	865	68.3	55	7	5	1/8	1-1/2	2
UH-3	UHP	MECHANICAL 35	26	26	10	865	68.3	55	7	5	1/8	1-1/2	2
UH-4	UHP	RECEIVING DOCK (DIRTY) 36A	26	26	10	865	68.3	55	7	5	1/8	1-1/2	2
UH-5	CAB	VESTIBULE 1	36	30	12	240	15.9	70	1.5	5	(60)	3/4	3

NOTES FOR UNIT HEATERS:

1. HOT WATER: 180 F EWT, 160 DEG F LWT
2. PROVIDE UNIT HEATER WITH 115V/1ø/60HZ ELECTRICAL, TOTALLY ENCLOSED MOTOR, COPPER TUBING, STANDARD FAN GUARD, DISCONNECT SWITCH, MANUAL STARTER, AND HOT WATER CONTROL.
3. PROVIDE CABINET UNIT HEATER WITH 115V/1ø/60HZ ELECTRICAL, HORIZONTAL RECESSED, BOTTOM STAMPED LOUVER INLET AND BOTTOM STAMPED LOUVER OUTLET.

FANS

UNIT NO	TYPE	LOCATION	SERVICE	MOTOR TYPE	CFM	WHEEL DIA	TSP	BHP	MOTOR HP	MOTOR V/PH/HZ	NOTES
360-SF-4	A	360-AH-4	SUPPLY AIR	ODP	13,000	30	3.8	11.2	15	460/3/60	3
360-SF-5	A	360-AH-5	SUPPLY AIR	ODP	11,000	27	3.2	8.3	10	460/3/60	3
360-SF-6	A	360-AH-6	SUPPLY AIR	ODP	4,400	15.75	4.9	5.9	7.5	460/3/60	3
360-SF-7	A	360-AH-7	SUPPLY AIR	ODP	1,400	12.38	3.6	1.47	2	460/3/60	3
360-RF-4	C	DUCTWORK SERVING AH-4	RETURN AIR	ODP	10,000	30	1.25	4.14	5	460/3/60	2
360-RF-5	C	DUCTWORK SERVING AH-5	RETURN AIR	ODP	9,350	30	0.75	2.57	3	460/3/60	2
360-RF-7	C	DUCTWORK SERVING AH-7	RETURN AIR	ODP	1,120	9	0.75	0.66	0.75	460/3/60	2
360-F-C6	D	WAREHOUSE AREAS	SPACE CIRCULATION	–	26,000	6 (FT)	–	0.375	0.375	120/1/60	1
360-EF-6	B	NORTH ROOF	EXHAUST	EC DIRECT DRIVE	700	9.9	0.75	0.18	0.25	115/1/60	4
360-EF-MECH	E	MECH ROOM	EXHAUST	ODP	3,700	30	0.42	0.5	0.5	115/1/60	5

NOTES FOR FANS:

1. BASIS OF DESIGN IS MACROAIR AIRVOLUTION MODEL 550 HIGH VOLUME LOW STATIC FAN WITH MULTIPLE FAN CONTROL MODULE.
2. BASIS OF DESIGN IS GREENHECK BSQ, BELT DRIVE CENTRIFUGAL INLINE FAN, PROVIDE REMOTE MOUNTED VFD.
3. PROVIDE SINGLE FAN OR MULTIPLE FAN ARRAY WITH THE BEST EFFICIENCY THAT MATCHES LISTED PERFORMANCE CRITERIA. PROVIDE FAN WITH VFD MOUNTED TO AIR HANDLING UNIT CASING.
4. BASIS OF DESIGN IS GREENHECK G, DIRECT DRIVE CENTRIFUGAL ROOF EXHAUST FAN. PROVIDE INTEGRAL DISCONNECT WITH FAN.
5. BASIS OF DESIGN IS GREENHECK MODEL SBE-3-H30-5. PROVIDE FAN WITH WALL MOUNTING BRACKETS, INTERIOR GAURD, BACKDRAFT DAMPER, AND 45 DEGREE WEATHER HOOD AT DISCHARGE.

CONVERTERS

UNIT NO	LOCATION	SERVICE	CIRCULATING FLUID FLUID	GPM	EFT	LFT	FPD	STM PSIG VALVE	STM PSIG CONV	STEAM LBS/HR	TRAP NO.	TRAP LBS/HR	NOTES
360-HX-1A	MECH ROOM	HEATING HOT WATER	WATER	140	145	180	1 FT	30	7.5	2,600	1	3,900	1,2
360-HX-1B	MECH ROOM	HEATING HOT WATER	WATER	140	145	180	1 FT	30	7.5	2,600	1	3,900	1,2

NOTES FOR CONVERTERS:

1. PROVIDE REDUNDANT HEAT EXHANGERS AS PART OF PACKAGED STEAM TO HOT WATER CONVERTOR/PUMP PACKAGE. BASIS OF DESIGN IS ARMSTRONG WS-103-2E1.
2. CONVERTERS FUNCTION IN ALTERNATING LEAD-STANDBY ARRANGEMENT.

FULLY SPRINKLERED

Additions:	Date

Revisions:	Date
SCHEMATIC DESIGN (30%) SUBMISSION	03/25/15
DESIGN DEVELOPMENT (60%) SUBMISSION	09/11/15
CONSTRUCTION DOCUMENTS (90% SUBMISSION)	11/23/15
BID DOCUMENTS	03/17/16

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Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 40828, Expiration Date: 6/15/2017

Approved:

Approved: Chief, Facilities and Engineering

Approved: Associate Chief for Maintenance And Operations, Perry Point

Approved: Engineering Projects Supervisor

Approved: Infection Control Officer

Drawing Title: MECHANICAL SCHEDULES

Approved: Associate Director for Operations

Approved: Director, Medical Center

Project Title: WAREHOUSE RENOVATION & EXPANSION

Scale:

Building Number: 360 | Checked: EPH | Drawn: MJF

Location: PERRY POINT, MD

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DEPARTMENT OF VETERANS AFFAIRS